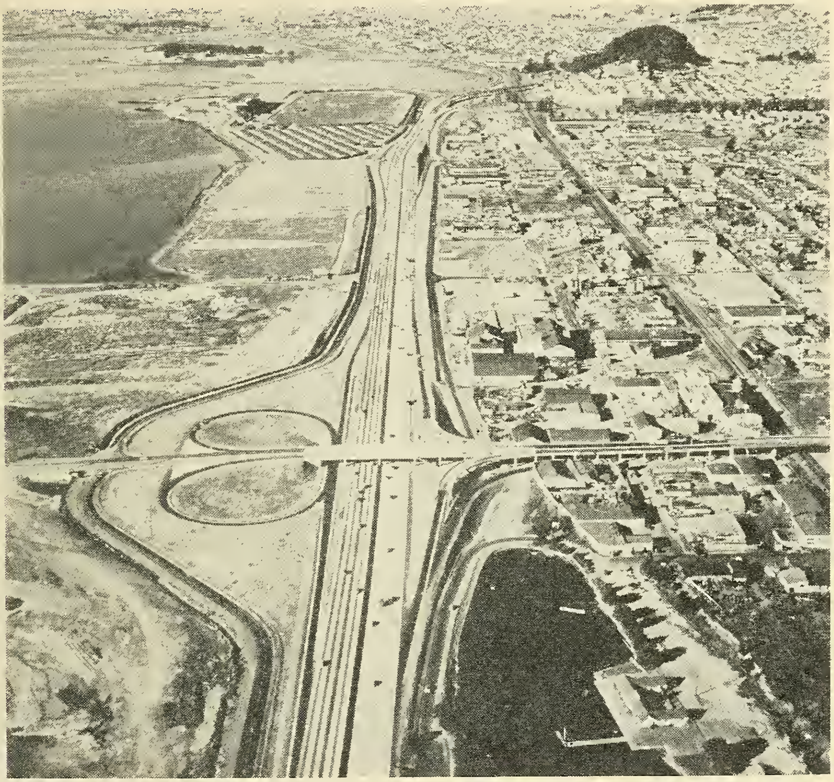
DEPOSITORY shelf
*
9388.173 A3

ANNUAL REPORT

Bureau of Public Roads

BOSTON PUBLIC LIBRARY
3 9999 06317 526 7

FISCAL YEAR 1957



The Richmond-Vallejo Highway (U. S. Route 40), approaching San Francisco, Calif., from the northeast, is a part of the National System of Interstate and Defense Highways

U. S. DEPARTMENT OF COMMERCE

Boston Public Library
Superintendent of Documents

MAR 11 1958

U. S. DEPARTMENT OF COMMERCE

SINCLAIR WEEKS, Secretary

LOUIS S. ROTHSCHILD, Under Secretary for Transportation

BUREAU OF PUBLIC ROADS

BERTRAM D. TALLAMY, Administrator

CHARLES D. CURTISS, Commissioner

CONTENTS

	Page
Introduction	1
The Federal-aid program	4
The National System of Interstate and Defense Highways	7
Federal-aid improvement of primary highways	10
Federal-aid improvement of urban highways	11
Secondary or farm-to-market roads	12
Highway improvements under direct supervision of Public Roads	14
Federal aid to Alaska	19
Progress in reports to Congress	20
Highway design	24
Bridge design	26
Right-of-way acquisition	27
Roadside improvement	27
Use of aerial surveys	28
Geodetic markers for control of highway surveys	28
Coordinated planning of highways and airports	29
Emergency planning and mobilization readiness	29
Repair of flood-damaged roads	29
Foreign activities	30
Highway safety	35
Administration and management	36
Development of new practices	38
AASHO road test	39
Financial and administrative research	40
Highway transport research	42
Hydraulic research	46
Physical research	48
Errata	55
Appendix, tables	57

For sale by the Superintendent of Documents, U. S. Government Printing Office,
Washington 25, D. C. — Price 30 cents

ANNUAL REPORT OF THE BUREAU OF PUBLIC ROADS

Introduction

THE fiscal year 1957[1] was a year of great beginnings, as the biggest peacetime public works program in history, set in motion by the Federal-Aid Highway Act of 1956, got into full stride.

Expenditures for highway construction and rights-of-way on all streets and highways, by all levels of government, were estimated at $4.9 billion in the calendar year 1956 and it was anticipated that they would reach $5.8 billion in the calendar year 1957. A forecast of motor-vehicle registrations indicated that there would be a total of 67 million registered in the calendar year 1957, 2 percent more than in the previous year. Mileage of travel on main rural highways increased by 3.4 percent during the fiscal year.

Progress was good in work on all classes of highways. Work was begun on a large scale on the Interstate System, and expressways were being planned or were under construction on many vital cross-country routes and in nearly all large cities. Other major highways and streets in and between cities were being improved; bridges were being built over waterways and to separate crossing streams of traffic; and the rapid improvement of secondary roads continued.

The Bureau of Public Roads had set a fiscal year goal of $2.225 billion in Federal obligations for surveys and plans, acquisition of rights-of-way, and construction. At the year's end, actual obligations totaled $2.223 billion. Contracts were awarded during the year for improvements to 25,845 miles of highways and streets. Work was completed during the year on 23,979 miles. At the year's end, construction was underway or scheduled to start soon on 29,261 miles of improvements.

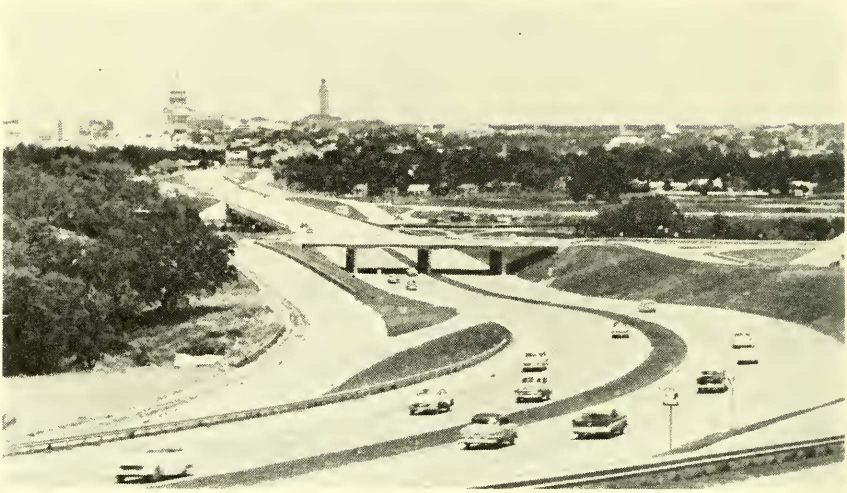
The attention of the public was caught and concentrated during the year on the concept of the Interstate System. Hearings were being held across the land to consider the detailed locations of routes planned to go through or bypass communities. Thousands of individuals were immediately affected as their property was purchased for right-of-way. Business, industry, local government officials, and plain citizens debated the values of bypasses versus through routes. They considered benefits of controlled access with respect to the elimination of congestion, the reduction in travel time, the greater comfort in travel, the savings in vehicle operation costs, and the improvement of adjacent property values through industrial and residential development. They learned that modern, planned access highways can cut the traffic death rate in half and the accident rate by two-thirds, as compared with ordinary roads.

The State highway departments were working closely with city and county officials and planning bodies to select locations and develop the system in the best overall public interest.

Much was accomplished on the Interstate System during the year. A total of 2,939 miles of improvements was programed, estimated to cost $2.4 billion. Contracts were awarded for 1,532 miles of construction. But the program was launched only a year ago, practically from a standing start. Much of the work

---

[1] The fiscal year extended from July 1, 1956, through June 30, 1957.



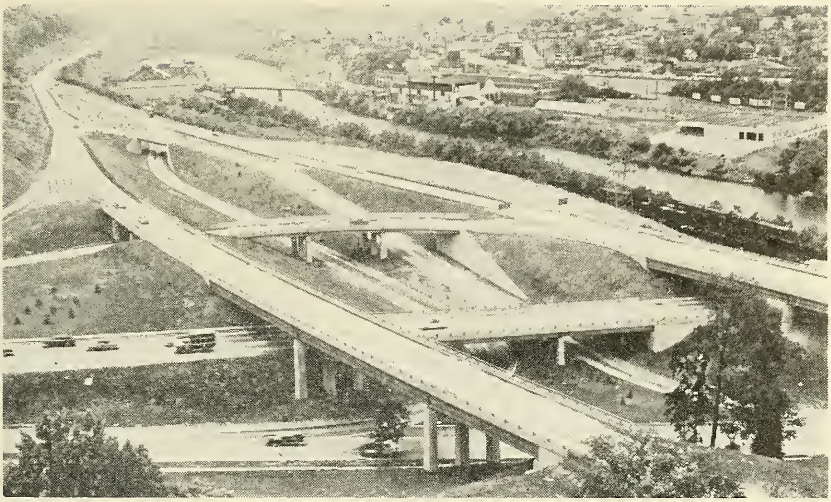
The Austin Expressway, Austin, Tex. This section, entering Austin from the south and providing 6 traffic lanes plus 2-lane frontage roads on each side, was recently opened to traffic. Designated as U. S. Route 81, the expressway is a part of the Interstate System. In the background are the State Capitol and the University of Texas campus. Construction of the remaining 16-block section of the expressway is expected to begin in 1959.

and expenditures of the early years will be in planning, engineering, and acquisition of rights-of-way. In the fiscal year 1957, 11 percent of the total funds obligated for the Interstate System was for preliminary engineering, and 31 percent for right-of-way acquisition. Interstate projects are large-scale, complex undertakings, consuming 3 or 4 years' time from conception to completion. The public cannot nor should not expect to ride over many miles of these magnificent new expressways, which they so eagerly await, for several years to come.

The multibillion dollar Federal-aid program is being financed on a pay-as-you-go basis from Federal excise taxes on gasoline, tires, trucks, and other highway-user levies which go into a highway trust fund. The law provides that the regular primary, secondary, and urban Federal-aid funds have first call on trust fund balances. For the fiscal year 1957, trust fund receipts were within $60 million of reaching the estimated $1.542 billion revenue. Treasury Department estimates for the years ahead, made at the close of the year, indicated that it may not be possible to apportion Interstate funds to the States at the rate authorized, and that it may require 16 years to complete the program.

The Federal-aid program is accomplished almost entirely under the traditional American practice of competitive contract construction under contracts let by the States. During the fiscal year, 7,112 contracts for Federal-aid projects were awarded, including 2,875 contracts for the improvement of the Interstate System. The awards approximated 2 contracts per contractor and an average of 6 bids were received by the States for each contract awarded, showing continued spirited competition in bidding.

The upward trend in highway construction bid prices, which began in the first quarter of fiscal year 1956, continued throughout the fiscal year 1957. Fourth quarter 1957 prices were 2.4 percent above the previous peak, which had occurred in the third quarter of fiscal year 1953.



The Schuylkill Expressway (City Line Avenue Interchange) in Philadelphia, Pa. This 20-mile expressway, a part of the Interstate System, joins the Pennsylvania Turnpike near Valley Forge with the downtown area of Philadelphia. Traffic west of the interchange averages 25,000 vehicles daily, and east of the interchange, 55,000 vehicles daily which required transition from 4 to 6 traffic lanes.

During the fiscal year 1957, highway construction wage rates increased 6.0 percent. Because of increased productivity, however, the cost of labor increased only 1.6 percent. Highway construction materials costs increased 4.6 percent and equipment ownership costs increased 6.8 percent during the fiscal year. The weighted average increase of labor, materials, and equipment ownership costs was 4.3 percent.

Steel was in short supply in some areas during the year and a strike in portland cement producing plants in the spring of 1957 delayed some highway work. Shortages of materials in the future appeared less likely to occur.

The engineering manpower shortage was critical but was being alleviated by increased use of engineering aids and subprofessional technicians. The use of electronic computers, aerial photography, standardized plans, and other methods and techniques was greatly multiplying the amount of work accomplished per engineer. Consultant engineering services on preliminary engineering, including surveys and preparation of construction plans, particularly for the Interstate System, were being used more than ever before by the State highway departments, since in many cases their own engineering staffs were unable to handle all the work.

Recognizing the tremendous burdens of administering the huge new Federal-aid program, the Congress in 1956 created the position of Federal Highway Administrator, to be appointed by the President with the approval of the Senate. President Eisenhower announced the intention to nominate, upon his availability, Mr. Bertram D. Tallamy, Chairman of the New York State Thruway Authority and previously Superintendent of Public Works of New York State. Meanwhile Mr. John A. Volpe, formerly Commissioner of Public Works for Massachusetts, was appointed as interim Administrator. Mr. Tallamy was sworn into office on February 5, 1957.

During the year the reorganization of the Public Roads field organization was completed, and much of the Federal-aid review and approval authority was delegated to the field offices. Reorganization of the headquarters office was undertaken during the year, to be completed in the next fiscal year.

A problem of great potential danger in the huge new Federal-aid program is the possible misuse of funds, especially in connection with the acquisition of rights-of-way. During the year Public Roads undertook to assign appraisers in each of its field offices to cooperate with the States in establishing satisfactory acquisition procedures and records and to review the acquisition of each parcel of property.

In addition, a project examination division was set up to audit and spot check both Public Roads and State procedures and operations in all aspects of the Federal-aid program. It is believed that these new operations, coupled with long-standing precautions, will fully protect the public interest.

The Congress, in the Federal-Aid Highway Act of 1956, called for intensive studies by Public Roads, in cooperation with the State highway departments and others, on (1) the costs of completing the Interstate System, (2) the allocation of highway cost responsibilities and benefits, (3) the role the Federal Government can play in increasing highway safety, (4) the problems of reimbursement that might be made to the States for toll and free roads already built and now included in the Interstate System, and (5) maximum desirable vehicle size and weight limitations. Public Roads is also collaborating with the States and others in the extensive road test in Illinois. All of these studies, in both intensity and scope greater than any heretofore undertaken, were put underway during the fiscal year and were progressing satisfactorily. They are described in detail elsewhere in this report.

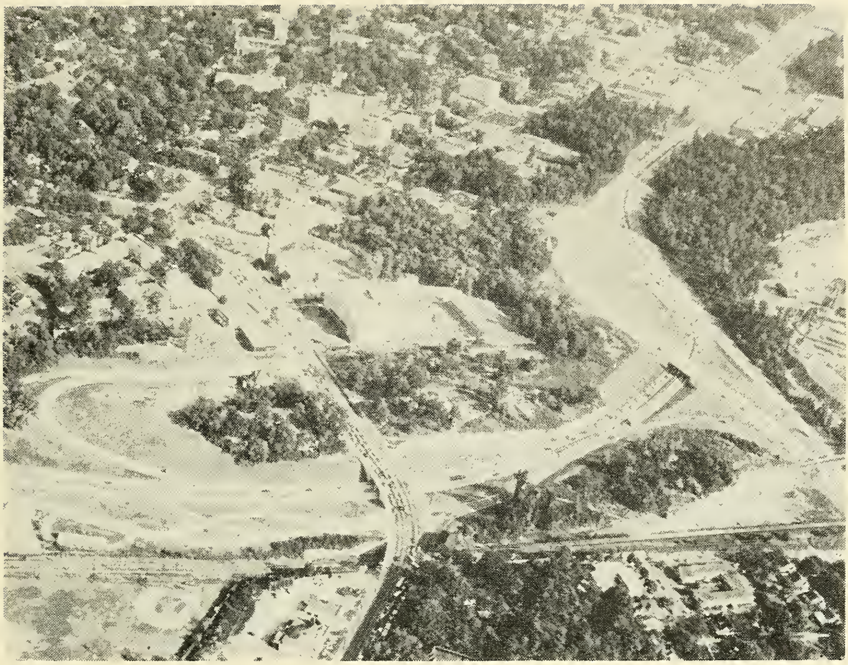
The year marked the passing of Thomas H. MacDonald, former Commissioner of Public Roads, who died on April 7, 1957. He was called to head the Bureau of Public Roads in 1919 at a time when congressional legislation had only recently created the Federal-aid program and a whole body of principles and procedures had to be developed. He organized and continually fostered the cooperative Federal-State relations in highway work that continue successfully today. Mr. MacDonald had retired in 1953 after 34 years of outstanding Federal service.

The Federal-aid Program

The Federal-Aid Highway Act of 1956 authorized a new and enlarged Federal-aid highway program that, in its entirety, will be one of the great construction projects of all time. In addition to continuing the cooperative effort that has evolved during the life of the Federal-aid highway program begun in 1916, the 1956 act carried a number of innovations, the effects of which are only beginning to be realized after the first year of operation.

The act reflected the extent of Federal interest in the construction of the Interstate System, 41,000 miles of highways of greatest importance to the nation as a whole, by the high matching ratio provided (90 percent Federal—10 percent State) and by the authorization over a 13-year period of Federal funds estimated to be sufficient, with State matching funds, to complete the construction of the entire system. The act went beyond previous legislation in prescribing that design standards for the Interstate System should be adequate to accommodate the types and volumes of traffic forecast for the year 1975, and by requiring controlled access as an important feature.

Another innovation was the establishment of a Federal highway trust fund into which revenues from Federal highway-user taxes are to be deposited. While one aspect of this fund is that the expenditures of the Fed-



A completed portion of the Atlanta Expressway, Atlanta, Ga. This view shows the junction of the northeast and northwest legs; the heavily traveled street passing over the northeast leg is Peachtree Street. Of the 20 miles of the completed expressway, traffic volumes range from 20,000 to 60,000 vehicles daily.

eral Government for highways must not exceed the amounts available in the fund, it also requires that specific highway-user revenues received by the Federal Government shall be expended for highways.

Classes of Federal-aid work

Federal-aid highway authorizations since World War II have provided Federal funds for three classes of highways—primary, secondary, and urban. A total of $550 million was authorized for these three classes of highways for each of the fiscal years 1954 and 1955. Authorizations have steadily increased ever since, to $700 million for 1956, $825 million for 1957, $850 million for 1958, and $875 million for 1959. These funds are matched equally by the States.

Beginning with the fiscal year 1954, annual authorizations also have been made specifically for improvement of the National System of Interstate and Defense Highways. The Federal-Aid Highway Act of 1956 inaugurated the long-range program for the intensive development of the Interstate System, authorizing a total of $24.825 billion for the 13 fiscal years 1957–69 to provide for completion of the entire system. These funds are matched on a 90-percent Federal, 10-percent State basis.

Apportionments made

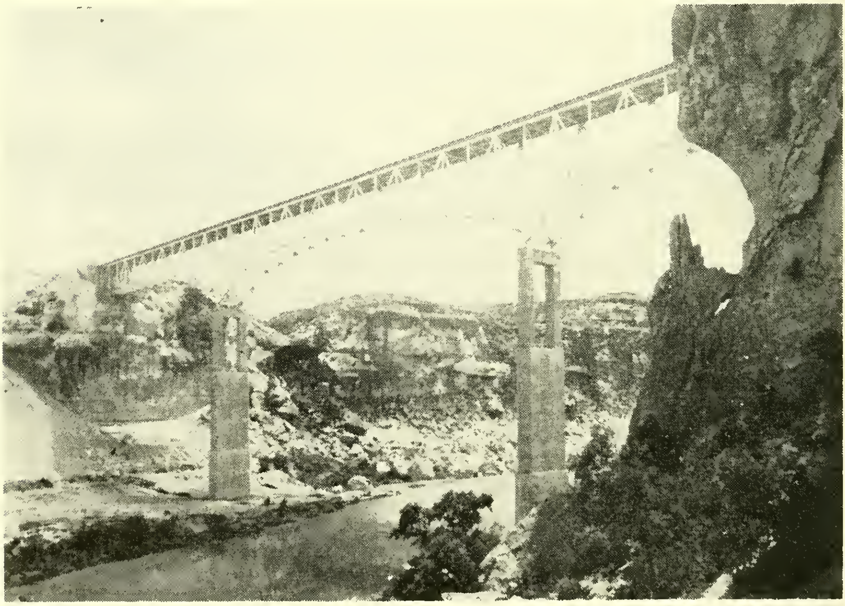
The first apportionment under the Federal-Aid Highway Act of 1956 was made June 29, 1956, and covered the additional funds authorized for the fiscal year 1957. This apportionment totaled $1.125 billion of which $1 billion was for the Interstate System. On August 1, 1956, the fiscal year 1958 Federal-aid highway funds were apportioned. These totaled $2.550 billion, of which $1.700 billion were for the Interstate System. Thus, within approximately one month from the passage of the 1956 act a total of $3.675 billion was made available for the Federal-aid highway construction programs; over four times that for any previous year.

Accomplishments during the fiscal year

A total of $2.223 billion of Federal-aid funds was obligated on Federal-aid projects during fiscal year 1957, the first year of the expanded program.

Projects for the construction of 28,398 miles were programed during the year. Contracts were awarded during the year for improvements to 25,845 miles of highways and streets. Construction put in place during the year amounted to $1.036 billion of Federal funds, an increase over the previous year of 43 percent. At the year's end, construction was underway or scheduled to start soon on 29,261 miles of highways and streets.

Completions of all classes of Federal-aid and Federal projects during the year accounted for the improvement of 23,979 miles of roads. Included were 6,953 miles of highways and 1,458 bridges on the Federal-aid primary highway system outside of cities, 1,176 miles of highways and 636 bridges on urban portions of the Federal-aid primary and secondary highway systems, 14,715 miles of roads and 1,958 bridges on secondary or farm-to-market roads, and 1,135 miles of highways in National forests, parks and parkways, and on flood-relief projects.



The new Pecos River Bridge, located on U. S. Route 90, Val Verde County, Tex., was completed in 1957. This 1,310-foot-long structure, financed with State and Federal emergency relief funds at a cost of nearly $1.4 million, spans the Pecos River chasm 273 feet above the normal water level. The former bridge, built in 1923 with clearance of 50 feet above the water level, was destroyed by floods in June 1954.

The long-range program of eliminating hazards at railway-highway grade crossings was advanced during the year by elimination of 230 crossings, reconstruction of 28 inadequate grade-crossing structures, and protection of 349 crossings by the installation of flashing lights or other appropriate safety devices.

The figure for miles of highway completed during a year's period does not furnish a complete measure of the highway facilities provided for traffic, since a considerable mileage has more than two traffic lanes. The major portion of improvements financed from urban and interstate funds consists of 4-lane and 6-lane construction. Table 6 in the appendix shows by program and by State, the mileages of completed improvements having 2 lanes, 4 lanes, and 6 lanes or more. Table 7 shows, in summary, that the 22,844 miles of Federal-aid projects completed during the year included 1,737 miles of 4-lane highways and 138 miles having 6 lanes or more. Thus, the year's Federal-aid completions provided the equivalent of 49,715 miles of single-lane construction.

Status of work at end of fiscal year

Improvements to 27,967 miles of highways and streets and construction of 7,657 bridges were included in the active Federal-State cooperative program at the close of the fiscal year (tables 2 and 5 of appendix). These figures include projects for which plans had been approved or construction had been started but was not yet completed. The estimated total cost of this work was $4.4 billion, including $2.7 billion of Federal funds. Grade crossing work included in the active program consisted of elimination of 560 railway-highway grade crossings, reconstruction of 50 inadequate grade separation structures, and the protection of 372 railway-highway grade crossings by installation of flashing lights or other appropriate safety devices.

The active program for construction of defense access roads, National forest, park, and public lands highways, and restoration of flood-damaged roads and bridges involved improvements to an additional 1,294 miles at a total estimated cost of $108.6 million, including $89.1 million of Federal funds.

Tables in the appendix show details of accomplishments during the year and the status of the program at the end of the year.

The National System of Interstate and Defense Highways

The National System of Interstate and Defense Highways, commonly called the Interstate System, is an integrated network of routes that connect our country's principal metropolitan areas, cities, and industrial centers, serve the national defense, and connect at suitable border points with routes of continental importance in Canada and Mexico. As such, the system includes most of the heaviest-traveled main arteries of the nation. Interstate System routes are included in and constitute the most important portions of the Federal-aid primary system.

The system was created by the Federal-Aid Highway Act of 1944 and limited at that time to 40,000 miles. General locations of 37,700 miles of city-to-city routes were officially designated in 1947, and the remaining 2,300 miles of routes into, through, and around cities were designated in 1955.

Provision for completion of the system by the Federal-Aid Highway Act of 1956 made the prompt selection of detailed locations for every route an urgent goal. Immediately after passage of the act the States undertook the engineering and economic studies necessary to select definite locations for the routes of the Interstate System, and at the end of the fiscal year locations for about 80 percent of the 40,000-mile system had been selected and approved by Public Roads. Interstate highway locations had been completed in 7 States and 21 additional States had in excess of 90 percent of the locations selected. The

Chicago's Wells Street Plaza, a giant traffic interchange linking the Congress Street Expressway with Wacker Drive. In the foreground is the new $5-million twin bascule bridge spanning the South Branch of the Chicago River.

studies have revealed that less than one-quarter of the Interstate System highways will be located on the traveled way of existing highways.

The Federal-Aid Highway Act of 1956 provided for an increase of 1,000 miles in the authorized mileage of the National System of Interstate and Defense Highways, bringing its total extent to 41,000 miles. In connection with such additions, the States submitted tentative selections for integration into the 40,000-mile system totaling in excess of 13,000 miles. The proposed routes were being considered on a national basis as required by statute, taking into consideration as basic factors the needs of national defense, system integration, transportation requirements of industry and agriculture, and population service.

For the first 10 years of its existence no special funds were authorized for construction of the Interstate System, but Federal-aid primary and urban authorizations could be and were used to a large extent for that purpose. The Federal-Aid Highway Act of 1952 specifically authorized $25 million for the Interstate System for each of the fiscal years 1954 and 1955, available on the regular Federal-aid matching basis of 50-percent Federal and 50-percent State funds. Authorizations of $175 million made for each of the fiscal years 1956 and 1957 were available on the basis of 60-percent Federal and 40-percent State matching funds.

The Federal-Aid Highway Act of 1956, in providing for completion of the system, authorized a total of $24.825 billion for improvements, distributed through the 13 fiscal years 1957–69. The matching basis for these funds is 90-percent Federal and 10-percent State matching funds. Apportionment to the States of the $1 billion authorized for the fiscal year 1957 was made on June 29, 1956, and of the $1.7 billion authorized for the fiscal year 1958 on August 1, 1956.

Improvements involving Federal-aid interstate funds were completed during the fiscal year on 737 miles of the Interstate System at a total estimated cost of $173,313,297 of which $117,887,307 were Federal funds. Completed work involved 528 miles of bituminous and portland cement concrete surfacing, 178 bridges over streams, and 109 bridges over highways to facilitate the free flow of traffic. In the interest of reducing the hazards of highway travel, 22 railway-highway crossings were eliminated by grade-separation structures.

The work completed during the year was accomplished almost entirely with interstate funds authorized prior to the 1956 act. This is not surprising in view of the fact that surveys, acquisition of rights-of-way, preparation of plans, and other operations for projects of the magnitude and complexity involved in the Interstate System often take 3 or 4 years from initial programing to the final completion for traffic service. Many of the route sections are being built as stage construction; that is, one project providing for the grading and drainage work, and a subsequent project providing for the pavement and appurtenances needed before the road can be opened to traffic.

That the States were galvanized into action by the 1956 act is indicated by the programing of a total of 2,939 miles of improvements during the fiscal year, estimated to cost $2,409,417,081 and involving $1,988,998,343 of Federal-aid interstate funds.

At the end of the year planning and construction of Interstate System highway facilities were going on at a furious pace throughout the nation. A total of $729,397,856 was programed, $191,178,628 was obligated for preliminary engineering, and $541,097,519 was obligated for acquisition of rights-of-way. There were 689 projects advertised for bids or awarded to contract for 1,878 miles of construction, estimated to cost $997,394,799.

The Jacksonville Expressway, Jacksonville, Fla. When completed, this expressway, for which planning began in 1937, will provide rapid movement into and through Jacksonville for traffic originating primarily from U. S. Routes 1, 17, 23, and 90. A considerable portion of the expressway will be part of the main north-south and east-west interstate routes in Florida.

Excluding projects programed only, a total of $1.7 billion was obligated for the Interstate System, of which 11 percent was for preliminary engineering, 31 percent for right-of-way acquisition, and 58 percent for construction. The high percentages of the first two elements of cost indicate preparation for construction work in the coming year.

Federal-aid Improvement of Primary Highways

Federal funds for the Federal-aid primary highway system have been provided continually since the Federal Highway Act in 1921 made provision for designation of the system. The 249,136-mile system is made up of the principal highways of the nation and includes 228,586 miles of rural highways and 20,550 miles in urban areas (as of December 31, 1956), including the mileage of the Interstate System. Primary fund authorizations amounted to $247.5 million for each of the fiscal years 1954 and 1955, $315 million for 1956, $371.25 million for 1957, and $382.5 million for 1958. The latter amount was apportioned to the States on August 1, 1956.

A total of 7,848 miles of improvements, estimated to cost $807,621,724 and involving $423,818,734 of Federal-aid primary funds, was programed during the year.

Improvements involving Federal-aid primary funds were completed during the fiscal year on 6,914 miles of the Federal-aid primary highway system at a total estimated cost of $607,465,964, of which $315,530,629 were Federal funds. Completed work involved 5,827 miles of bituminous and portland cement concrete surfacing, 1,098 bridges over streams, and 146 bridges over highways to facilitate the free flow of traffic. In the interest of reducing the hazards of highway travel, 87 railway-highway crossings were eliminated by grade-separation structures, 13 separation structures were reconstructed, and 116 grade crossings were protected by the installation of signal devices.

Photo by Merle Junk, Olympia, Wash.

Grading and filling of the eastern approach of the Capitol Lake Bridge in Washington. This structure is a part of the Olympia Freeway, a fully controlled access highway carrying traffic through the Olympia-Tumwater urban area.

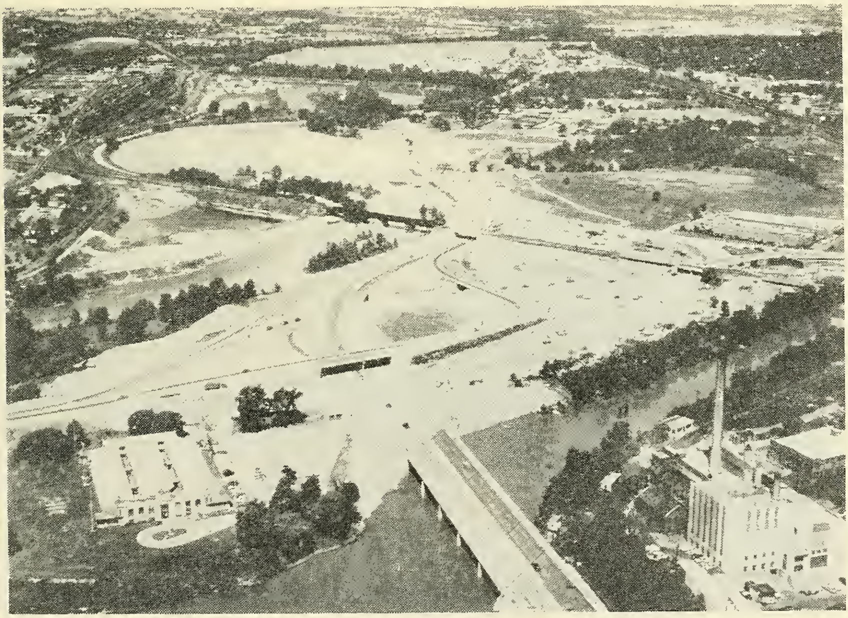
Recognition that growing volumes of traffic must be served with greater safety was evidenced by the increasing mileage on the Federal-aid primary system being built as divided highways, some with partial or full control of access.

Federal-aid Improvement of Urban Highways

Federal funds have been provided specifically for improvement of the Federal-aid primary system in urban areas continuously since 1946, evidencing Congressional concern over the growing seriousness of urban traffic congestion. Urban fund authorizations amounted to $137.5 million for each of the fiscal years 1954 and 1955, $175 million for 1956, $206.25 million for 1957, and $212.5 million for 1958 (apportioned to the States on August 1, 1956).

A provision of the 1954 act made Federal-aid urban funds available also to finance improvements on urban extensions of the Federal-aid secondary system. Up to June 30, 1957, $18.9 million of the authorized urban funds had been applied to work on these secondary route extensions.

Programs were approved during the year on projects in urban areas involving Federal-aid urban funds for a total estimated cost of $424 million, the Federal contribution being approximately $214 million, for the improvement of 453 miles. Work financed from urban funds was completed during the year on 351 miles of urban highways at a total estimated cost of $346 million. The Federal contribution was $171 million. Completed work involved 315 miles of bituminous and portland cement concrete surfacing, 96 bridges over streams, and 197 bridges over highways to facilitate the free flow of traffic. In addition, 78



The Spring-Sandusky Interchange, Columbus, Ohio. This is the first completed section of the Innerbelt around the downtown area of Columbus. The Innerbelt will be a part of the Interstate System. The Spring-Sandusky Interchange, completed at a cost of $4.2 million, is expected to carry 52,000 vehicles daily when the Innerbelt is completed.

railway-highway crossings were eliminated by grade-separation structures, 10 separation structures were reconstructed, and 35 grade crossings were protected by the installation of signal devices.

The improvement of important urban highways has become a major objective of the State highway departments and cities as traffic congestion continually increases. In addition to the separate authorizations of Federal-aid urban funds, approximately 15 percent of all Federal-aid primary funds have been utilized for improvements in urban areas.

In the past few years construction of urban expressways had absorbed about one-third of the interstate funds allotted to projects for which plans were approved. An even greater proportion will be used in urban areas in the future, for it is anticipated that the urban portions of the Interstate System will account for nearly half of its total cost. During the fiscal year 1957, 47 percent of the funds programed for the Interstate System were for urban projects. Controlled-access freeways were being planned, and in many cases were under construction, in practically every large city in the nation.

Federal provision for construction of the Interstate System with 90 percent Federal aid will also greatly benefit the cities indirectly. The interstate funds are carrying the heavy financial burden of the vital freeway links in urban areas, thus freeing the Federal-aid urban funds for use on other major streets with smaller volumes of traffic but still of considerable importance to the municipalities served.

Secondary or Farm-to-Market Roads

The Federal-aid secondary highway system includes important farm-to-market routes, rural mail routes, and school-bus routes. The system length totals 528,378 miles, including 8,028 miles of extensions in urban areas (as of December 31, 1956). Funds for secondary roads have been included regularly in Federal-aid authorizations beginning with the fiscal year 1938, but the secondary system as such was created by legislation in 1944. Secondary fund authoriza-

Federal-aid secondary road bordering Lake Willoughby in Vermont. This recently constructed road eliminated the steep grades and winding alinement of the old narrow road and provides a low-cost bituminous surface of ample width for recreational, farm-to-market, and through traffic. This route serves as an alternate to U. S. Route 5 between St. Johnsbury and Newport.

The final link of the park-to-park highway joining Silver City, N. Mex., and Springerville, Ariz., was completed this year under the Federal-aid secondary program. This section in the Mogollon Mountains of New Mexico replaced an unsurfaced, narrow roadway of poor alinement and limited sight distance. The new, all-weather road opens a recreational area which has remained undeveloped because of lack of access.

tions amounted to $165 million for each of the fiscal years 1954 and 1955, $210 million for 1956, $247.5 million for 1957, and $255.0 million for 1958. The latter amount was apportioned to the States on August 1, 1956.

A total of 16,096 miles of improvements, estimated to cost $520,915,861 and involving $274,162,042 of Federal-aid secondary funds, was programed during the year.

Improvements involving Federal-aid secondary funds were completed during the fiscal year on 14,843 miles of the Federal-aid secondary highway system at a total estimated cost of $399,034,108 of which $205,790,689 were Federal funds. Completed work involved 8,922 miles of bituminous and portland cement concrete surfacing, 1,933 bridges over streams, and 13 bridges over highways to facilitate the free flow of traffic. In the interest of reducing the hazards of highway travel, 39 railway-highway crossings were eliminated by grade-separation structures, 4 separation structures were reconstructed, and 190 grade crossings were protected by the installation of signal devices.

Since the beginning of the system program immediately after World War II, improvement of 140,015 miles of farm-to-market roads has been completed, or about one-fourth of the total system mileage. The number of projects average about 3,500 annually and are located in some 2,000 counties each year. Altogether, secondary projects have been constructed in more than 3,000 of the 3,070 counties of the United States during the past 11 years.

The Federal-aid secondary system comprises about one-sixth of all the rural road mileage in the United States. The roads in this system are the principal local roads in the various counties in which they are situated. The local officials and the State highway departments cooperatively select the routes of the system, choose the improvement projects to be programed each year, and determine the design and construction standards, all subject to Public Roads approval.

The secondary system in recent years has been growing annually at a rate about the equivalent of the mileage improved. There is no limitation on the mileage of local roads which may be included in the Federal-aid secondary system other than it should not exceed the financial capacity of the local road agencies to build and maintain. It is expected, however, that in the future the need for rebuilding the light surfaces constructed on some secondary roads in the early years of the program and now wearing out, and the need for reconstruction of some routes to higher standards to keep pace with traffic growth, will sharply diminish requests for additions to the system.

The plan for simplified administration of the secondary road improvement program under the provisions of the 1954 act was operative in 44 States and Puerto Rico at the end of the fiscal year. Arizona, Indiana, New Mexico, West Virginia, the District of Columbia, and Hawaii continue to operate under the regular Federal-aid procedure. The 1954 plan permits the Secretary of Commerce and the Bureau of Public Roads to transfer much of the engineering and administrative responsibility for Federal-aid projects to the State highway departments by acceptance of the State's certification that approved standards and procedures have been used on secondary projects, in lieu of examining each project step by step to assure compliance with Federal-aid requirements.

Highway Improvements Under Direct Supervision of Public Roads

Under existing legislation, the Bureau of Public Roads receives and administers directly annual appropriations for the major highways through National forests, and performs highway engineering and construction services for other Federal agencies as required by law and as may be requested for specific projects. The branches of the Government receiving direct appropriations for the construction and maintenance of roads and requesting Public Roads assistance include the Atomic Energy Commission and the Departments of Agriculture, Defense, and Interior.

The following tabulation indicates the volume of highway work as of June 30, 1957, in which the engineering and construction services of Public Roads were actively engaged (the figures include estimated costs of work in the program, plans approved, advertised, and/or construction stage):

Bureau of Public Roads:	
Forest highways	$44, 741, 207
Federal lands	770, 509
Miscellaneous access roads	212, 555
National Park Service:	
Park roads	14, 333, 843
Parkways	25, 982, 410
Forest Service: Forest development roads (including beetle-control roads)	9, 359, 383
Bureau of Indian Affairs: Indian reservation roads	497, 000
Department of Defense: Access roads	2, 159, 700
Atomic Energy Commission: Access roads	72, 000
Bureau of Land Management	5, 148, 834
Total	103, 277, 441

In addition to the forest highway work indicated, there were forest highway projects involving Federal funds, constructed under State supervision, estimated to cost $4,205,053.

Forest highways

The forest highway system, totaling 24,428 miles, is located in 39 States and in Alaska and Puerto Rico. Approximately half of this length (12,434 miles) is located in the 11 Western States, South Dakota, and Alaska, where the largest National forest areas lie. The system is composed of main and secondary roads within or adjacent to the National forests, and is largely coincident with the Federal-aid and State highway systems. Table 17 of the appendix indicates, by forest road class, the system mileage in each State or Territory.

This system is a small but highly important segment of the nation's network of public roads. Forest highways, in addition to being of primary local and area importance, also carry most of the transcontinental traffic across the Rocky Mountains and the Coastal Ranges as well as a considerable amount of the interstate traffic in other areas. Although progressive improvement of the forest highway system has been accomplished over a period of many years by the cooperative efforts of the States, counties, and the Federal Government, the rate of improvement has not kept pace with the ever-increasing demands.

During the fiscal year, Public Roads completed improvements on 497 miles of forest highways at a cost of $20,979,008 of which $18,919,815 were Federal funds. Table 16 of the appendix indicates these completions, and reports the totals by States for projects programed, authorized, and under construction at the close of the year. Some typical forest highway improvements underway or completed during the year are described in the following paragraphs.

Placerville-Lake Tahoe highway, California.—This primary highway, in addition to being a main trans-Sierra Nevada route, is a gateway to the many recreation areas in the vicinity of Lake Tahoe. Traffic counts of 4,000 vehicles per day during the week, and up to 9,000 on Sundays and holidays, are common in the summer season. The highway between Pacific House and Riverton traverses a rock palisade where no alternate location is feasible. The 1.1-mile section of 4-lane divided roadway under construction during the year, estimated to cost $1,265,000, will replace the existing 18-foot width section.

Marvine-Phippsburg highway, Colorado.—During the past year construction of 7.6 miles of grading and base course was completed on this route at a cost of $420,000 and another project 7.0 miles in length was let to contract at an estimated cost of $625,000. This highway, in addition to serving the general public, will provide access to a large volume of spruce timber (killed by beetles) for use in making paper pulp. The road will open up areas not now served by a highway.

Lewis and Clark Highway.—This 220-mile route will eventually connect the communities of Lewiston, Idaho, and Missoula, Mont. It crosses the Bitterroot Mountains via Lolo Pass, closely paralleling the route traveled by the Lewis and Clark Expedition 150 years ago. The forest highway portion of this route in Idaho extends 101 miles from Kooskia northeasterly along the Lochsa River to the Montana State line. This mileage, plus 33 miles in Montana, is of service primarily to Government timber holdings, forest recreation areas, and for forest administration. Construction has been underway on this route in Idaho since 1919, gradually narrowing the uncompleted gap to 15.6 miles. No road now exists in this gap. The work accomplished to date has been financed partly with forest highway and Federal land funds and partly with Federal-aid primary and State funds. Some sections constructed many years ago will require reconstruction prior to opening of the entire length to traffic. It is expected that traffic through Lolo Pass will reach 500 to 1,000 vehicles per day when the route is open and paved throughout its entire length. Thirteen miles of grading and bridge construction, estimated to cost $1,387,000, were under contract during the year. Part of this work extended into the impassable section.

Vernal-Manila highway, Utah.—This route has become increasingly important since construction of the Flaming Gorge Dam was authorized by the Congress. During the year a crushed gravel base course was placed on 8.5 miles of the route, at a cost of approximately $434,500.

Snake River Canyon highway in Wyoming.

Snake River Canyon highway.—This route in Wyoming is a popular approach to the Grand Teton-Yellowstone Park area from the south and west. During the past year 11.5 miles of bituminous surfacing and 4.3 miles of bituminous stabilized base course were completed on the route and 4 miles of grading and stabilized base course were let to contract, leaving approximately 6.5 miles to be reconstructed to modern standards. The cost of the work completed and initiated during the past year was $900,000.

National park highways, park approach roads, and parkways

Funds are appropriated to the Department of the Interior for the construction and improvement of highways within or approaching National parks and monuments, and for parkways specifically designated by legislation. These funds are administered in conformity with regulations jointly approved by the Secretary of the Interior and the Secretary of Commerce. The Bureau of Public Roads collaborates with the National Park Service in establishing systems and developing annual programs. Public Roads engineers make surveys, prepare plans, and supervise construction of projects on major roads.

During the past year improvements were completed on 142 miles of park highways, park approach roads, and parkways under contracts totaling $11,059,000. The work included grading and surfacing and bridge and tunnel construction. At the close of the year, 250 miles of improvements were under construction by contracts totaling $25,261,000. Tables 18 and 19 of the appendix indicate the general locations of this construction activity. Typical improvements are described in the following paragraphs.

Blue Ridge Parkway.—This scenic parkway in Virginia and North Carolina currently has 340 miles of surfaced roadway open to the public. During the year 13.8 miles of construction, including 5 bridges, were completed at a cost of $1,263,000. At the end of the year, 37.3 miles of grading and base course, bridges, and tunnel construction work were underway at a total estimated cost of $5,281,000.

Colonial Parkway.—Major work on this 23-mile parkway in Virginia was substantially completed in April, permitting traffic on the entire parkway from Yorktown to Jamestown Island for the opening of the 350th anniversary celebration of the founding of Jamestown. Work completed during the year consisted of a ferry wharf, and 11.0 miles of roadway, bridge, and viaduct construction at a total estimated cost of $2,063,000. At the close of the year, 11.9 miles of concrete paving, estimated to cost $1,637,400, were nearly completed.

Everglades National Park.—During the past year hydraulic dredging and stockpiling of oolite material and 18 miles of grading and surfacing were completed at a total estimated cost of $2,046,000 on roads in this park in Florida. At the close of the year, 17 miles of grading, surfacing, and bridge construction were underway at an estimated total cost of $1,078,000. By the end of the 1957 construction season, all current work on the main road in this park should be substantially complete, thus providing a new access to the recreational facilities of one of our newest National parks, as well as providing a new cross-State highway.

George Washington Memorial Parkway.—This parkway in Virginia, across the Potomac River from Washington, D. C., is being extended to provide access to the new building planned for the Central Intelligence Agency. During the past fiscal year, contracts totaling $5 million were let to provide for the grading of 5.14 miles of 4-lane divided parkway and the construction of 5 major bridges.

Natchez Trace Parkway.—Bituminous surfacing was completed during the year on approximately 6.3 miles of this parkway and 5.4 miles of incidental roads near Natchez, Miss., increasing to 119 miles the total length of the parkway open to traffic in Alabama, Mississippi, and Tennessee. Many of the 16 bridge structures and a great percentage of the 25 miles of grading and base course work contracted last year were completed. At the close of the year, 33.8 miles of grading and base course construction and numerous bridges and overpasses, estimated to cost $3,825,000, were under construction.

Mt. Rainier National Park.—Construction along the 18.5-mile Stevens Canyon route in Washington, connecting the Nisqually Entrance road with the East Side road near Ohanapecosh, has been underway since 1931. Surfacing of this entire length, tunnel lining, and slope stabilization underway since 1954, were nearing completion at the end of the year. The scenic route will serve tourists visiting Reflection Lake and Louise Lake, and provides a new cross-State summer route over the Cascade Mounains.

Forest development roads and access roads for spruce-bark beetle control

Public Roads, when requested by the Forest Service, makes surveys, prepares plans, and supervises construction within National forests of roads of importance in the protection, administration, and utilization of the forests. Public Roads has also provided engineers for the location and construction of access roads in the spruce-bark beetle control program. During the year, 149 miles of forest development roads and beetle-control roads were completed under contracts totaling $6,558,000. At the close of the year, work on 118 miles of construction, estimated to cost $6,450,000, was underway.

Bureau of Land Management roads

Public Roads continued its cooperation with the Bureau of Land Management of the Department of Interior in a program of road construction in Oregon to provide access to areas for logging operations, and to areas for the salvaging of timber attacked by beetles. During the year, construction was completed on 122 miles at a cost of $4,933,000. At the end of the year, 109 miles were under contract for work estimated to cost $3,372,000.

Indian reservation roads

Public Roads continued, under agreement with the Bureau of Indian Affairs, to provide general supervision for the programing, design, and construction of roads and bridges in Indian reservations. During the year work programed or under construction totaling 1,351 miles and estimated to cost $13,230,000 was under the direct responsibility of the Bureau of Indian Affairs. In addition, under the direct supervision of the Bureau of Public Roads and at the request of the Bureau of Indian Affairs, work on 26.5 miles was completed at a cost of $498,000 and was underway on 14.4 miles estimated to cost $394,000.

Construction in Alaska

During the year, Public Roads had under its direct supervision approximately 70 miles of construction on highways in the Chugach and Tongass National Forests in Alaska. At the end of the year, 26 miles had been completed at a cost of $1,217,000 and 44 miles, estimated to cost $2,382,000, were under construction.

Defense access, replacement, and maneuver road program

The Atomic Energy Commission transferred an additional $2,073,000 to Public Roads during the fiscal year, increasing the total funds transferred for the construction and improvement of access roads to sources of uranium ore to $8,473,000. The Commission also transferred $155,778 for the improvement of an access road within the boundaries of the Oak Ridge, Tenn., plant. These funds, with the $9,991,000 transferred by the Commission under authority of Public Law 149, 83d Congress, increased the total funds transferred by the Atomic Energy Commission to $18,619,778.

The military departments transferred to Public Roads military construction funds appropriated under Public Law 814, 84th Congress, for access roads to military reservations and defense industries. These transfers included $3,548,560 from the Department of the Army, $1,088,165 from the Department of the Navy, and $7,932,088 from the Department of the Air Force—a total of $12,568,813.

An additional $300,000 appropriated to the Department of Defense for maintenance and operations was also transferred for repair of 257 miles of road in Louisiana damaged during "Exercise King Cole" and "Exercise Sledge Hammer" held between March 27 and May 16. These transfers, with the $18,523,911 of Department of Defense funds transferred during the fiscal years 1955 and 1956, increased the total funds transferred by the Department of Defense to $31,392,724.

Including the $42 million previously appropriated under legislative authority of 1950 and 1952, funds appropriated for access roads since the beginning of the Korean emergency totaled $92,012,502.

Standard specifications

During the past 2 years, Public Roads has been working on a complete revision of its own construction specifications used to govern highway improvements made under direct supervision of the Bureau. The text was reviewed by the Public Roads staff and field engineers and by committees and representatives of highway contractors and material and equipment producers and suppliers. The work was completed during the fiscal year and published under the title *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects* (*FP–57*). As was the case for the 1941 edition, the new specifications will undoubtedly be used by other Government agencies either as a reference or as a basic specification or guide.

Federal Aid to Alaska

Public Roads has been active in Alaska since 1919, but until enactment of the Federal-Aid Act of 1956 its responsibilities were limited to administration of the forest highway program within the Tongass and Chugach National Forests and to assistance with special programs of military import. From 1919 through 1956, some 400 miles of forest highways were constructed at a cost of approximately $50 million.

Under the terms of the 1956 act, Federal aid for highways for the first time was extended to Alaska. The Alaska Road Commission, which had administered the Territory's highway program outside the National forests since 1905, became a part of the Bureau of Public Roads. Created in 1905 as an agency of the War Department, the Commission had become a part of the Department of Interior in 1932. Administration of the 4,485-mile highway system developed by the Commission at a cost of approximately $230 million, and all personnel, equipment, property, and unexpended appropriations, were transferred to the Department of Commerce on September 16, 1956. The organization was combined with the existing Public Roads Alaska office to form Bureau of Public Roads Region 10. The regional office was established at Juneau, the Territorial capital, with district offices at Anchorage, Valdez, Fairbanks, Nome, and Juneau.

The 1956 act entitles Alaska to share in Federal-aid primary, secondary, and urban funds, as have the Territories of Hawaii and Puerto Rico for some years past. It provides for use of Federal funds for either construction or maintenance of Alaskan highways. In recognition that a large part of Alaska is relatively uninhabited and to obtain an equitable apportionment of Federal funds relative to highway needs, Congress modified the formula for computation of the apportionment of Federal funds among the States and Territories with respect to Alaska by using only one-third of the area of Alaska instead of its full area. The law also provides that the Territorial government shall contribute to the highway fund an amount equal to 10 percent of the amount apportioned each year by the Federal Government. The net effect is that funds available for Alaskan roads under Federal aid will permit a roadbuilding program to be launched in Alaska with sufficient continuity to permit long-range planning.

Federal-aid highway systems, designated in accordance with provisions of section 107 of the Federal-Aid Act of 1956 and totaling 5,152 miles, were established in Alaska during the year. The 1,959-mile primary system, composed principally of hard-surfaced highways, connects the Territory's principal interior cities and military establishments with one another, with the all-weather, ice-free ports of Haines, Valdez, and Seward, and with the continental United States via the Alaska Highway through Canada. The 3,193-mile secondary system is basically a feeder system, and except for a few hard-surfaced sections in the vicinity of population centers, it consists of gravel roads. Approximately one-half of the secondary system is connected to the primary network; the balance connects isolated communities with rail, water, or air transportation facilities. The entire primary system, except for ferry connections, and approximately 1,000 miles of the secondary system are kept open on a year-round basis.

The 1957 fiscal year construction and maintenance program totaled approximately $30 million, including $23.8 million in Interior Department carry-over construction and maintenance projects, $2.6 million in reimbursable work for other agencies, and $4.6 million Federal-aid construction and maintenance. Contracts were let for construction of the final section of the 160-mile Denali Highway to connect Mt. McKinley National Park, which contains the continent's highest peak, with the Territory's connected highway network, and for paving the final section of the 365-mile Richardson Highway which connects Valdez and Fairbanks. At the close of the year, 115 Federal-aid projects totaling $16 million were programed and remaining Interior Department projects valued at $5 million were active.

The Territory of Alaska has not as yet established a working highway organization of its own, but instead has utilized the services, formerly of the Alaska Road Commission and now of the Bureau of Public Roads, to accomplish its highway program. In Alaska, consequently, Public Roads, in addition to discharging its usual administrative responsibilities, performs all of the functions of a State highway department including location surveys, design, contract administration, and highway maintenance, all utilizing Government forces and equipment. At the end of the fiscal year, 1,008 employees were on Region 10 rolls and the automotive and construction equipment fleet numbered in excess of 1,500 units.

Progress in Reports to Congress

The Federal-Aid Highway Act of 1956 and the companion Highway Revenue Act of 1956, enacted at the close of the previous fiscal year, called upon the Secretary of Commerce to undertake a number of studies, in cooperation with the State highway departments, and report their findings to the Congress. Most of these studies, delegated by the Secretary to the Bureau of Public Roads, were well underway at the end of the year.

In addition to the work reported in the following paragraphs, much of the research described in the latter part of this report was directly or indirectly related to these studies.

Interstate System cost estimate

Section 108 (d) of the Federal-Aid Highway Act of 1956 required that, in cooperation with the State highway departments, periodic detailed estimates be made of the cost of completing the Interstate System, based on adopted standards and accomplished uniformly among all of the States. Such estimates, when approved by concurrent resolution of the Congress, will be used in apportioning Federal-aid funds for the Interstate System among the States. The first estimate is to be reported to the Congress in January 1958, and will be used in apportioning the funds authorized for the fiscal years 1960, 1961, and 1962.

The design standards for the Interstate System were adopted shortly after the passage of the act, as reported in last year's annual report.

Of the 40,000 miles authorized for the Interstate System when it was created in 1944, the general locations of routes had been determined in 1947 for some 37,700 miles. The remaining 2,300 miles, all in urban areas, were selected in 1955.

The first step necessary in estimating the cost of completing the system was the determination of specific locations for every route. This in itself was a tremendous undertaking, requiring both engineering and economic studies. By the end of the fiscal year, specific detailed locations had been selected by the States and approved by Public Roads for about 80 percent of the total mileage.

For the remainder, where decisions could not be reached in the time available, feasible locations, the most reasonable in cost of several desirable alternates, were being used for the purposes of the cost estimates. Many of these tentatively selected sections were in cities where the problems of traffic service and economics are exceedingly complex.

The extent of mileage, the adjuration of the Congress for uniformity, and the year-and-a-half time limit for the job, coupled with the fact that apportionment of funds among the States will be made according to the results, make this the most important as well as the biggest and most detailed study of its kind ever undertaken.

To obtain the necessary uniformity, estimate breakdowns, and supporting data, a tentative manual of instructions was prepared by Public Roads in cooperation with representatives of the American Association of State Highway Officials and several individual State highway departments. After trial operations, and meetings with the State highway departments to assure uniform interpretations, operating procedures, and schedules, the manual in final form was sent to all State highway departments in October 1956.

An important feature of the Interstate System design is that the routes are to be constructed to accommodate adequately the types and volumes of traffic forecast for the year 1975. A guide for such forecasting was developed by Public Roads and distributed to the States as a supplement to the cost estimating manual.

Necessary to the forecasting was study of present travel volumes and habits, and consideration of probable future population growth and movement, economic development, and changes in patterns of motor-vehicle ownership and use. Statewide forecasts and, subsequently, forecasts for each route section had to be made to determine the number of traffic lanes and capacity of interchanges required throughout the system. The importance of the traffic forecasting to the development of cost estimates is obvious. The States cooperated wholeheartedly in the preparation of the traffic forecasts and cost estimates, and field teams of State and Public Roads engineers studied every mile of the system on the ground.

By the end of the fiscal year, cost estimates covering about 95 percent of the system mileage had been received in the Public Roads Washington office. As an indication of the difficulty of the job, these estimates comprised individual study of some 6,000 road sections averaging about 6½ miles each in length.

Analysis and summarization of the voluminous material received and preparation of a report to the Congress will be undertaken in the coming fiscal year.

Highway cost allocation study

Preliminary phases of work on the study called for by section 210 of the Highway Revenue Act of 1956 were well advanced at the end of the fiscal year. The purpose of this study of highway cost responsibility and benefits is to provide the Congress with information on the basis of which it can determine what taxes should be imposed by the Federal Government, and in what amounts, to assure an equitable distribution of the tax burden among the various classes of persons using Federal-aid highways or otherwise deriving benefits from such highways.

The terms of the act require a two-pronged approach to the problem: (1) That of costs occasioned by the use and frequency of use, on the Federal-aid highways, of vehicles of different dimensions and weights; and (2) that of the benefits derived, or to be derived, from the Federal-aid improvement program. The study of benefits must embrace not only the immediate benefits derived by users of vehicles of different types and sizes, but also, according to the act, ". . . any direct and indirect benefits accruing to any class which derives benefits from Federal-aid highways, in addition to benefits from actual use of such highways, which are attributable to public expenditures for such highways."

The problem of allocating Federal-aid highway cost responsibility among different classes of vehicles will be attacked chiefly by the incremental method, although other means of differential-cost analysis will be explored. The incremental method is founded on the concept that there are certain basic costs in the provision of highways in which all vehicles should share on a uniform basis, and that additional costs attributable to size of vehicle should be shared by successively smaller groups of vehicles in ascending order of size.

A comparative study of the benefits of the Federal highway program, both vehicular and nonvehicular, will, it is hoped, provide evidence on which to base findings on the extent to which revenue sources other than motor-vehicle taxes might be equitably drawn upon for partial support of the Federal-aid highway program. A study of the variation of vehicular benefits with the dimensions and weights of vehicles will provide an alternative solution of the motor-vehicle tax-allocation problem.

The work program of the study includes the following major phases: (1) Collection and special classification of motor-vehicle registration and taxation data; (2) estimation of physical highway needs and their cost through a considerable future period, according to highway systems, and a detailed schedule of standards and elements of construction and maintenance requirements; (3) collection and assembly of highway traffic volume and weight data according to systems and by so-called visual and gross weight classes of vehicles; (4) determination of structural and geometric design standards and accompanying cost factors required for each increment of demand made upon highway facilities because of increasing size or weight (gross, axle, or wheel load) of vehicles, or their frequency of occurrence in the traffic stream; (5) study of the differential benefits derived from the use of the highways by vehicles of different dimensions and weights; (6) study of nonvehicular benefits, to be measured by the effects of highway improvement on land and property values, on business development and other land uses, and on other features of the economy; and (7) application of the data obtained in operations 1 to 6 to the final solutions and findings of the project.

Planning for the collection of data to be processed, the assembly and analysis of material to be studied in each of the six areas of work just described, and the methods for processing and correlating the material in each of those areas are being undertaken by the Public Roads headquarters staff. Collection and arrangement of the data for each State for the incremental and benefit analyses are being done by the State highway departments, chiefly through their highway planning divisions, and aided by the Public Roads field offices.

Of the seven phases, the first, dealing with the classification of vehicles and their corresponding road-user tax payments, showed the greatest progress at the end of the fiscal year; the data collection had been completed in 38 States, of which 4 States had turned in their reports and 17 were in the final stage of preparing summary tables. At a much earlier stage but showing satisfactory progress were phases 2 and 3, dealing with highway needs and with traffic volume and composition. The remaining three data-collecting phases—incremental design standards and cost factors, vehicular benefits, and nonvehicular benefits—were at still earlier stages, but in each of them work had begun. The phase of final analysis, interpretation, and report writing must await the production and preliminary analysis of data in the earlier phases.

As required by the 1956 act, a report of progress on the study was prepared and presented to the Congress on March 1, 1957. The report discusses the problem of equitable allocation of the Federal-aid highway tax burden, provides a comprehensive review of the background of that problem, gives consideration to the approaches to its solution that have been made in the past, outlines the principal methods of solution that will be used in this study, and identifies alternative methods that will be considered or fully explored. Finally the plans for conducting the study are set forth in the report and the accomplishments to date are reviewed.

The 1956 act requires that the final report on the study of highway cost responsibility be submitted to the Congress not later than March 1, 1959. This requirement practically necessitates confinement of the data-collection phases of the study to the year 1957, so that assemblies and analysis of all material can be accomplished and the final report prepared during 1958.

Reimbursement study

The Federal-Aid Highway Act of 1956 provides that toll roads, bridges, or tunnels in existence or constructed in the future may be included in the Interstate System, if they meet the design standards, although Federal aid may not be used for their improvement (with certain exceptions relating to bridges and tunnels). In the selection of specific locations of routes by the States, a number of such facilities were included in the Interstate System, as were some toll-free facilities already built by the States with or without Federal aid.

In recognition that this situation would arise, section 114 of the 1956 act declared it the intent of the Congress to determine whether or not the Federal Government should equitably reimburse the States for toll or free highways on the Interstate System built between 1947 and 1957. To that end, as directed by the act, Public Roads is to determine, in cooperation with the State highway departments, which highways would qualify for reimbursement (if made) and their cost and depreciation. A report of the results of this study is to be made to the Congress in January 1958.

Initial information needed for the study included determination of the road sections, to which possible reimbursement might apply, that have been incorporated in the Interstate System, comparison of their design with the system standards, and records of their original cost and present condition. Since much of such information was being obtained through the needs study required by section 108 (d) of the 1956 act, action on the reimbursement study was deferred until the material became available for use.

At the end of the fiscal year, Public Roads officials were formulating detailed plans for the study. Representatives of the American Association of State Highway Officials will cooperate in the planning, and a manual will be prepared for guidance of the State highway departments in collecting and reporting all needed information.

Highway safety study

Section 117 of the Federal-Aid Highway Act of 1956 directed that a comprehensive study be undertaken, and reported to the Congress by March 1, 1959, to determine what action can be taken by the Federal Government to promote the public welfare by increasing highway safety. Public Roads appointed a director for this study in December 1956, and liaison was promptly established with the Special Subcommittee on Traffic Safety of the House of Representatives to aid in developing Public Roads' plan of study.

In brief, the highway safety study contemplates a broad appraisal of present highway safety efforts, both official and non-official, the identification of major deficiencies in these programs, and the preparation of recommendations as to the optimum Federal role in highway safety.

One of the more promising activities just beginning at the end of the year was a case study of accident causes by an investigating team of engineer and medical and social scientists. Elsewhere, in about a dozen selected States, the cooperation of highway, police, and motor-vehicle officials was enlisted in special researches directed toward the speed factor in highway safety. Exhaustive studies of the large economic losses occasioned by highway traffic accidents were going forward in several other States. Numerous contacts with representatives of the automotive and allied industries and groups concerned with legislation, traffic law enforcement, safety education, and public support were providing valuable guidance to the study.

Negotiations were underway with the Department of Health, Education and Welfare for a supplemental study in connection with the National health survey started at the end of the fiscal year. Communities with widely varying accident experience will also be surveyed in the interest of isolating the characteristics that make for highway safety or the lack of it. Federal agencies, major associations of State and local government officials, and others having responsibilities for safety on the highway will also be contacted in developing the practicable courses of Federal action.

Maximum desirable vehicle sizes and weights

Section 108 (k) of the 1956 act directed that all possible action be taken to expedite the American Association of State Highway Officials road test, in which Public Roads is cooperating. Progress on the project is described in another section of this report.

Pertinent to the basic purpose of section 108 (k), that recommendations as to maximum desirable dimensions and weights of vehicles operated on the Federal-aid systems be reported to the Congress, Public Roads was working on an extensive study of the economics involved in the road-vehicle relation. The work is described in this report in the section on highway transport research.

Highway Design

Passage of the Federal-Aid Highway Act of 1956 culminated general planning for the Interstate System and advanced engineering work into the detail location and design stages. The act assured completion of the system and provided for the adoption of geometric and construction standards cooperatively with the State highway departments. At the beginning of the fiscal year, the American Association of State Highway Officials completed and adopted a revision of its Interstate System standards prepared by its committee on planning and design policies in conjunction with Public Roads engineers. These standards were approved by Public Roads on July 17, 1956, and immediately put into use.

The standards call for incorporation of all known features of safety and utility, to provide for safe and relaxed driving, economy of vehicle operation, and pleasing appearance. Features required to accommodate traffic anticipated in 1975 are to be provided in the initial design, but construction may be accomplished in stages where justifiable.

On all sections of the Interstate System, access will be controlled and facilities will be planned to enable vehicles to enter or leave the highway safely. Grade separations generally will carry cross roads over or under the routes of the system. In sparsely settled rural areas of the west where traffic volumes are low, intersections at grade will be permitted under certain conditions and if no appreciable hazard is created. There will be no railroad grade crossings.

Curves, grades, and sight distances of the interstate routes will be planned for driving in safety and comfort (actual speed regulation will, as always, be under the control of the States).

Traffic lanes will be not less than 12 feet wide. Nearly all of the system is to consist of divided highways with 4 or more traffic lanes. In flat country where drivers are able to see great distances at all times, 2-lane highways will be permitted if the traffic expected in 1975 does not exceed about 5,000 vehicles daily, but in such cases the roadway will be built to one side of the right-of-way so an additional pavement, to provide a divided highway, can be added in the future. In rolling and mountainous topography divided highways will be provided for lower traffic volumes. Divided highways will generally have 2-lanes in each direction, but 6- and 8-lane sections will be built where needed.

Median areas between the two roadways of divided highways will be at least 36 feet wide, except in urban and in mountainous areas where a minimum of 16 feet will be permitted. Under unusual conditions of terrain or right-of-way cost, the median may be reduced to not less than 4 feet. Medians will often vary in width, in rural areas, since the two roadways will in propitious locations be designed as two separate entities in order to use the topographic and scenic features to best and most economic advantage.

Shoulders at least 10 feet wide (6 feet in mountainous terrain), usable by all classes of vehicles in all weather, will be provided on the right of traffic.

Wide rights-of-way will be required, but fixed standards are not prescribed because conditions of difficult terrain and exorbitant cost will sometimes have to govern. Rights-of-way need not be of constant width. The standards offer, as a guide, minimum widths required in rural areas ranging from 150 feet for a 2-lane road to 300 feet for an 8-lane divided highway with frontage roads on each side. In urban areas the right-of-way must be wide enough to accommodate the roadway and necessary slopes, walls, and frontage streets.

Bridges and overpasses will preferably be deck type (no overhead obstruction). All structures will allow at least 14 feet vertical clearance over the roadways and shoulders.

The Interstate System standards provide all essential guides in highway design but for the details needed by locating and design engineers reference is made to the adopted policies of the American Association of State Highway Officials. One of these, *A Policy on Geometric Design of Rural Highways*, was prepared by the Association's committee on planning and design policies and Public Roads engineers and was published by the Association in 1954. A supplemental work, *A Policy on Arterial Highways in Urban Areas*, was completed during the year by the same group and was adopted by the Association on April 1, 1957. At the year's end, the book was in the hands of the printer. During the year the same group also completed *A Guide for the Application of Frontage Roads on the National System of Interstate and Defense Highways*, which served to bring about a nationally uniform approach to a design feature in which there had been a considerable variation of engineering opinion. This policy was approved by the Association for informational and guide purposes and on January 8, 1957, was adopted for use on the Interstate System by the Bureau of Public Roads.

The approved geometric standards for the Interstate System in general define the minimum acceptable roadway dimensions. However, the concept of the system calls for design of highways of unquestioned adequacy for the 1975 traffic needs, with use of the minimum dimensions to the extent found warranted and beneficial to the freeway traffic flow. To a degree never before experienced, the State and Public Roads engineers were confronted with the need for making a series of precedent-setting decisions on the first few projects.

Numerous interpretations were required, particularly in respect to the maximum logical dimensions that can be economically justified. Establishment of a working policy in each State within a nationally uniform pattern has been necessary, as well as determinations regarding elements of design not covered in detail in the standards.

Public Roads engineers cooperated closely with State highway department officials in working out the details of these first projects, which did much to establish the basis for future work. Many of the preliminary plans so considered were for costly and complex designs, including interchanges, and a series of conferences between State and Public Roads engineers on the details of location and design were necessary to resolve the particular problems. As individual features were determined in one State, all other States were advised so that they could benefit by the conclusions. Thus they were afforded considerable time saving on similar projects of their own, and national uniformity was promoted.

Bridge Design

The planned construction of the Interstate System for traffic anticipated in 1975 has resulted in a large number of bridge projects, many of them complicated structural designs at the intersections of important highways. During the year Public Roads reviewed plans for 3,800 major bridges on the Interstate and primary highway systems.

An enlargement and revision of *Standard Plans for Highway Bridge Superstructures* was published during the year. This should be of great benefit to the highway program, in the face of the shortage of engineering manpower. Information on design and installation criteria for reinforced concrete pipe culverts was also prepared and distributed to the States.

Prestressed concrete construction increased greatly in volume and intensity during the year, in part accounted for by the delay in obtaining delivery of structural steel.

Welded bridge construction is also increasing. In some areas, the construction of major structures by welding has been undertaken for the first time.

A survey of the economy and usage of current structural bridge steels, which considered the proper use of both standard and proprietary steels, including high-strength and low-alloy steels, was completed and distributed to the States. Public Roads has been active in seeking adoption of a new high-strength, low-alloy steel for riveted construction, to supersede the present standard structural silicon steel, because of the difficulties arising from the welding of surface imperfections in the latter steel at the mills. A satisfactory proprietary steel at equal cost is being used and the aim is to have a standard specification adopted by the American Society for Testing Materials.

Research in structural problems connected with bridges has continued throughout the year. Public Roads is accomplishing such research in cooperation with various State highway departments, universities and industry.

During the year, complete bridge designs were prepared by Public Roads engineers for structures on the Inter-American Highway and for bridges in Liberia and Jordan. Preliminary plans and estimates for the Woodrow Wilson Memorial Bridge over the Potomac River at Alexandria, south of Washington, D. C., were also prepared.

For several years continuing negotiations between the Bureau of Public Roads and the Corps of Engineers have been aimed at reducing the requirements of navigational clearances of highway bridges wherever possible without unduly affecting the reasonable requirements of waterway transportation. An estimated total of $4,460,000 in highway bridge construction costs was saved during the year as a result of these efforts. The savings effected, in seven States, ranged from $37,000 in Florida to $2,140,000 in Maine, and included a total of $2,935,000 in Federal-aid funds. The reported savings did not include reduced costs to States and localities of maintaining and operating movable span bridges, which have resulted from reduced operating requirements applicable to the movable spans.

Right-of-Way Acquisition

Prior to passage of the Federal-Aid Highway Act of 1956, many States had depended upon local subdivisions to acquire and furnish rights-of-way without Federal-aid participation. In the enlarged program, Federal-aid participation in the cost of right-of-way has been greatly increased, particularly for the Interstate System. During the 3 fiscal years 1953–55 less than $100 million of Federal aid was paid for right-of-way costs for all projects; during the fiscal year 1957, by contrast, $369,835,853 of Federal aid was obligated for right-of-way acquisition on the Interstate System alone.

In anticipation of the increased requests for right-of-way participation, a survey of right-of-way practices and procedures in each State was made and right-of-way committees, composed of representatives of the Department of Commerce, Public Roads, and the American Association of State Highway Officials were formed. As the result of the efforts of these committees, a policy was formulated for the acquisition of right-of-way in which Federal-aid funds are involved. Public Roads, in implementing this policy, examined in detail the practices and procedures of each State highway department in the acquisition of right-of-way, and recommended modifications or improvements where they seemed warranted to protect the public interest, both Federal and State, as well as the interests of affected property owners. Careful attention was given to methods of appraisal, negotiation, condemnation, and documentation.

In view of the greatly increased use of Federal-aid funds in right-of-way acquisition, Public Roads has assigned right-of-way engineers in its regional offices and as rapidly as possible a sufficient number of right-of-way appraisers were being assigned to the Public Roads offices in each State, to provide close liaison with the State highway department right-of-way organizations. The right-of-way functions in the Public Roads Washington office were separated into an operating division in the Office of Engineering and a legal division in the Office of the General Counsel, and both divisions were being expanded to provide for consultation, coordination, and assistance in the handling of all phases of right-of-way acquisition.

In addition to such duties, Public Roads probably will have to acquire some rights-of-way for the Interstate System, when requested by the States under the Federal-Aid Highway Act of 1956, where it is shown that the State is unable to acquire necessary lands or interests in lands, or is unable to acquire the same with sufficient promptness. Several such requests by the States have already been received, and more are anticipated.

Roadside Improvement

Public Roads has continued to cooperate with State highway departments and committees of the American Association of State Highway Officials in formulating policies and standards aimed toward better integration of landscape development in the location and design of interstate highways. Emphasis has been placed on the preservation of trees, streams, and other landscape features of the route, on protection and preservation of the value of abutting lands, on erosion control requirements, and on the need for safety turnouts and rest areas for the convenience and safety of the traveling public.

The study of roadside improvement specifications used by the State highway departments, in progress last year, was completed and distributed to the State highway departments and other roadbuilding agencies. It will serve as a guide to the best practices in this field.

A study of roadside improvement work as shown in current State and Federal-aid highway project plans was continued. The study, when completed, will serve the States as a guide in preparing standard plans for Federal-aid highway construction, with inclusion of landscape development objectives in the earliest stages of highway location and design.

Use of Aerial Surveys

During the fiscal year Public Roads specialists conducted four conferences on the use of photogrammetry and aerial surveys in the solution of highway engineering problems, which were attended by about 400 engineers of State and county highway departments, consultant firms and universities.

Two 3-week schools were also conducted, at which 72 State and Public Roads engineers received training in the principles, procedures, and uses of photogrammetry and aerial surveys in locating and designing highways. Special training was also given to four foreign engineers, and a 3-month consultation service was performed for the highway engineering staff of Ethiopia.

Four State highway departments have become equipped to take aerial photographs and two of these have a staff to compile maps by photogrammetric methods. Three other States procured photogrammetric instruments in which are used photographs purchased by contract. Nearly all other States are now employing photogrammetric techniques in their highway location and design work, obtaining aerial photographs and topographic and planimetric maps by the contract method.

A guide to the preparation of detailed specifications for employing photogrammetric engineering firms on a commercial basis was completed by Public Roads and published during the year. Several States were given assistance in the use of these specifications, and Public Roads used the specifications in connection with the location of highways to be constructed entirely with Federal funds.

Geodetic Markers for Control of Highway Surveys

A program for the establishment of geodetic markers in accordance with specifications of the Coast and Geodetic Survey was initiated during the fiscal year. These markers will provide reliable data for the control of surveys for the location and construction of modern highways. Such controls are especially important in view of the increasing mileage of surveys being made by photogrammetric methods.

Extensive projects in this field, which for the present are limited to the Interstate System, have been completed or are in progress in seven States, using Federal-aid highway funds. The Coast and Geodetic Survey cooperates in this work to assure that its accuracy meets specifications. On many of the projects they are providing the equipment and personnel to conduct the entire operation on a cooperative basis.

In addition to the benefits that will accrue to the highway program, the markers will provide readily accessible control points for all other engineering and mapping surveys conducted in the future. State plane coordinates will be computed for all of these markers. All surveys based on the data developed for these markers are coordinated to a universal system of horizontal and vertical measurements, and are therefore interrelated so that data from any one of such surveys can be used on another survey without any additional field work. As this system is expanded it will be of great benefit to surveying and engineering work. Plans have already been formulated by many Federal, State, and local government agencies and private organizations for the use of the data developed for these markers.

Coordinated Planning of Highways and Airports

Expansion of the airport development programs for civilian and military use, especially those designated for use of the newer types of heavy aircraft, combined with the increased highway program has presented many conflicts between these facilities. Public Roads has cooperated closely with other Federal, State, and local highway and airport officials to insure careful planning and coordination of highways and airports. The cooperative efforts of all concerned have always provided an equitable and economical solution to these problems.

Emergency Planning and Mobilization Readiness

Numerous statutes impose upon the Bureau of Public Roads responsibility for giving adequate consideration to defense requirements in the conduct of its assigned functions. Executive Order No. 10219 also imposes certain responsibilities with respect to streets and highways. Public Roads has also been assigned duties and responsibilities under certain defense mobilization orders and delegations from the Federal Civil Defense Administration.

In connection with the civil defense program, Public Roads completed during the year a report entitled *A Preliminary Report on Highway Needs for Civil Defense.* This report, published and distributed by the Federal Civil Defense Administration, presented a nationwide appraisal of the adequacy of streets and highways extending from urban areas to meet requirements for evacuation of such areas. The report does not constitute an endorsement of evacuation as the sole hope for survival of urban populations, but attempts to place in perspective, within certain limits, the potential capabilities of evacuation by motor vehicles.

Planning for continuity of government and mobilization in a national emergency has also progressed both with respect to the Public Roads headquarters and its field representatives. Development of this program continues, in cooperation with other agencies concerned, and in the light of changing conditions of weapons development.

Repair of Flood-Damaged Roads

For many years it has been the policy of the Federal Government to aid the States in the repair or reconstruction of highways and bridges on the Federal-aid systems, damaged or destroyed by floods and other disasters of extraordinary character and extent. Such aid is available under an authorization permitting the use of available emergency funds without waiting for legislative action following each disaster. The Federal-Aid Highway Act of 1956 provided a continuing authorization of not to exceed $30 million annually for this purpose.

Allocations of emergency funds totaling $3,717,761 were made during the fiscal year to 10 States and the Territory of Hawaii for rehabilitation work estimated to cost $7,464,706 in total. Amounts allocated were as follows: California, $1,446,196; Connecticut, $39,956; Hawaii, $887,000; Idaho, $464,000; New Jersey, $60,000; New York, $17,770; North Carolina, $253,382; Oregon, $49,000; Pennsylvania, $33,650; Virginia, $458,425; and Washington, $8,382.

Severe flood damage occurred during January and February 1957 in Kentucky and Virginia, and during May and June 1957 in Louisiana, Minnesota, Oklahoma, and Texas. All of these States have submitted or indicated that they will submit requests for allocations of emergency funds for the reconstruction of flood-damaged highways.

West Virginia, which also suffered flood damage during the year, has advised they will not request an allocation of emergency funds.

During the year, floods, hurricanes, tornadoes, and tidal waves caused such serious damage that disaster areas were declared by the President in 14 States and 2 Territories. In each case, Public Roads personnel assisted the Federal Civil Defense Administration in surveying the damage and aiding State and local agencies in planning temporary relief.

Foreign Activities

Training of foreign engineers

Participation of the Bureau of Public Roads in our Government's program of technical assistance to other countries was continued at an accelerated rate during the year. Programs for study, training, and observation of highway improvement practices in the United States were prepared and implemented for 102 engineers and officials of other countries, sponsored by the International Cooperation Administration. Arriving singly or in groups, they were provided a total of 526 man-months of training during the year.

In addition to those sponsored by the International Cooperation Administration, Public Roads provided or arranged training for four engineers sponsored by the United Nations. Assistance was also rendered to visitors from other countries who were referred to Public Roads by the Department of State but who were not under any official United States or United Nations sponsorship. Individuals from 26 countries participated in these technical assistance programs.

The State highway departments continued their splendid cooperation during the year in providing these individuals with opportunities to study our techniques and practices.

The Inter-American Highway

Since 1930 the United States, through the Bureau of Public Roads, has been assisting the Republics of Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama in the construction of the Inter-American Highway, which is that section of the Pan American Highway from Nuevo Laredo, on our Mexican border, to Panama City, at the Pacific terminal of the Panama Canal, a distance of about 3,200 miles. Connecting highways from El Paso and Nogales, Tex., to Mexico City now afford more direct routes from the western United States.

The highways in Mexico have been financed and constructed entirely by Mexico.

At the end of the year, 95 percent of the Inter-American Highway was passable in all kinds of weather by motor vehicles, but uninterrupted travel to Panama City was still an impossibility. Throughout its length of about 1,600 miles in Mexico, the highway was open at all times and practically all of it was paved. In Guatemala, starting at the Mexican border, an impassable gap of 25 miles was under construction and scheduled for opening at the end of the year. This gap could be bypassed by rail. Beyond this gap, the highway was passable at all times as far as San Isidro, Costa Rica, a distance of about 1,100 miles. In this distance many sections were under construction, and there were additional sections on which considerable construction will have to be done to bring the highway up to modern standards for a 2-lane road, but the route was open and passable without undue difficulty.

Beginning at San Isidro, Costa Rica, a formidable impassable section of the route extends for about 150 miles through rough and undeveloped territory to Concepcion, Panama. This entire section was under construction. From Concepcion to Panama City, a distance of about 300 miles, the highway was passable at all times but several sections were being reconstructed to modern standards and some sections were still substandard.

During the 1957 fiscal year, the following was accomplished:

Congress appropriated $12 million toward the completion of Inter-American Highway.

In Guatemala, all of the highway not presently paved was under construction to bring it up to modern standards for a 2-lane road. During the year good progress was made on the grading and drainage of the new highway and placing of a sub-base. The work was being done by contracts, most of which were scheduled for completion in February 1958. Plans were being made to provide a base course of crushed stone as soon as the grading work is completed. Grading on the 25-mile impassable gap was completed at the end of the fiscal year, but bridges were still lacking.

In El Salvador, the highway was completed during the year to modern standards with asphalt surface throughout.

In Honduras, progress was slow on a 21-mile contract for grading and drainage between Jicaro Galan and the Nicaragua border. Plans were completed for the balance of the highway in Honduras, including 16 bridges. Structural steel required for these bridges was purchased by Public Roads so that there will be no delay on account of slow deliveries of steel.

In Nicaragua, that section of the highway between the Honduras border and Condega was practically completed as an all-weather road by forces of the Nicaragua Highway Department during the year. The placing of base course and final surface will be done by contract. Of the 17 bridges between the Nicaragua border and Sebaco, under construction by the Nicaragua Highway Department, 12 had been completed and 5 were under construction. A contract was awarded to an American contractor during the year for grading work in Nicaragua between Condega and Sebaco. The contract calls for the construction of an all-weather road to be completed by June 1959. In Southern Nicaragua, between Rivas and the Costa Rica border, a contract was awarded to an American firm for the construction of 10 bridges to replace temporary structures. The highway in this location was to be widened by forces of the Nicaragua Highway Department.

In Costa Rica, construction proceeded on the 145-mile contract for completion of the highway from the Nicaragua border to San Ramon. This section has been kept open to traffic at all times. In southern Costa Rica the entire 134-mile impassable section between San Isidro and the Panama border was under construction. Two contracts for 75 miles of grading, drainage, and bridges were awarded during the year, calling for completion by May 1958. A number of bridges must be built before the road will be open to all-weather travel. Fair progress was made by the contractors in opening up this long impassable gap in difficult terrain where access is a big problem.

In Panama, two contracts were awarded during the year for grading, drainage, and bridges on the last impassable section of the highway to be placed under construction between Laredo and Panama City. Completion was called for by the end of 1958. During the year, agreement was reached to relocate the highway between Santiago and Remedios over a more direct line than the existing route at a considerable savings in cost. The present highway between these points was passable at all times.

At the end of the fiscal year, all of the impassable sections of the Inter-American Highway were being built at least to all-weather standards. Construction was underway on 24 contracts with private contractors and the total volume of the work under contract was in excess of $56 million.

Other Latin American projects

In Guatemala, Public Roads continued furnishing engineering assistance to the International Cooperation Administration in connection with the construction and improvement of the Pacific Highway from Escuintla to the Mexican border and the Atlantic Highway from Guatemala City to Puerto Barrios.

In Nicaragua, Public Roads continued its technical assistance to the Republic in the planning and construction of their National Highway System (other than the Inter-American Highway), which is being financed in part by a loan from the International Bank for Reconstruction and Development (World Bank).

The United States is also assisting Nicaragua financially in the construction of the Rama Road which, when completed, will form the main transportation link between the settled portion of Nicaragua on the Pacific Coast and the large, undeveloped fertile area of eastern Nicaragua and the Atlantic Ocean. It begins at San Benito on the Inter-American Highway and extends 158 miles east to Rama, a river port on the Escondida River which can be reached by ocean vessels from the Atlantic. Construction began on this project in 1943 with United States funds and continued until June 1948, when funds were exhausted. An all-weather road had been practically completed from San Benito to Villa Samoza, a distance of 96 miles.

Work was resumed during the fiscal year 1955 and a contract let to a United States firm for 12 miles from Villa Somoza toward Rama was completed by the end of the fiscal year. Construction under another contract for a 15-mile section at the end of the 12-mile section has progressed normally during the year. Completion will provide an all-weather road for 123 of the 158 miles of the Rama Road. The survey for the balance of the road has been made and plans were nearing completion for contract construction of another section. An additional sum of $1,500,000 was appropriated by Congress in June for continuation of construction.

In Panama, Public Roads has been assisting the Government of Panama in a reconnaissance survey of a route to connect the Inter-American Highway at Panama City with the highways of Colombia and South America through the Darien jungle, an almost totally uninhabited region.

In Ecuador, the Manta-Quevado Highway was completed and the technical assistance being provided by Public Roads in its construction was terminated during the year.

Other foreign activities

Since the end of World War II, the Bureau of Public Roads has participated in highway activities in many foreign countries in cooperation with the Department of State, the Export-Import Bank, and the International Bank for Reconstruction and Development. In general, the programs in the foreign countries are to assist in establishing competent highway departments and to develop the countries by improved highway communications.

Activities were continued during the fiscal year in Ethiopia, Jordan, Liberia, Pakistan, the Philippines, and Turkey. New programs were begun in Iran and British Guiana and a program was just getting underway in cooperation with the Department of State for studies of a Baghdad Pact highway extending from Istanbul in Turkey through Iraq and Iran to Karachi, Pakistan.

Activities in Ethiopia.—In February, Public Roads completed its sixth year of supplying management personnel for, and directing the activities of the Imperial Highway Authority. During the year, maintenance services have been increased over the 3,225 miles of highways comprising the completed part of the present primary system. An inventory of present road facilities was completed.

Financial support of the highway improvement program for the year, including all costs of the Public Roads mission, was furnished by the Ethiopian Government. A total of $22.7 million has been supplied since 1951 by the Ethiopian Government to supplement the original $5 million loan (1951) from the International Bank for Reconstruction and Development. No United States funds have been used in this program. The Imperial Highway Authority has 4,500 employees of 22 nationalities. The Public Roads staff of 15 includes engineers, administrative officers, and superintendents.

The training program of the Imperial Highway Authority has been materially increased in tempo. During the year training has been given to equipment operators, survey crews, office workers, and drivers.

Activities in Iran.—A 2-year program of highway maintenance and training of highway personnel in Iran was initiated by a $5 million credit to the Government of Iran by the Export-Import Bank on December 7, 1956. An agreement between the Commissioner of Public Roads for the United States and the Minister of Roads and Communications for Iran forms the basis of Public Roads' Iranian operations. An engineer who will head the Public Roads division office in Iran arrived in Tehran on April 24, 1957, and by the end of the fiscal year a bridge engineer and four equipment specialists had reported for duty. Some 30 additional personnel are to be recruited.

Maintenance of Iran's 23,000 miles of roads has been by hand-labor methods with an average of one man equipped with a pick and shovel to 2½ miles of road. The result, of course, has been little or no drainage, rough surfaces, and almost complete deterioration of roads constructed by armed forces of the United States, Great Britain, and Russia during World War II.

American road construction and shop equipment was being purchased for establishing a large central shop and supply depot in Tehran and for training a highway maintenance organization in each province. Simultaneously it is planned to strengthen the central highway department in Tehran and to introduce modern highway administration practices.

Activities in Turkey.—The program of technical and economic assistance to Turkey continued throughout the fiscal year. In the technical assistance program emphasis was placed on equipment maintenance and operation. The Public Roads staff averaged 10 employees. A total of $1,507,000 was made available for economic assistance during the fiscal year.

The 1956 national highway budget was about $126 million—a substantial increase over previous budgets—indicating the importance placed on highway development by the Turkish Government. User revenue covers only a fraction of this budget. Development since the program began in 1947 has resulted in opening all sections of the country to travel on all-weather roads, and each year has added a substantial length of modern highway to the system.

Activities in Pakistan.—Public Roads engineers have been advising the Government of Pakistan in the formation of a highway organization, the conduct of highway inventory, condition, and traffic surveys, the preparation of a highway needs study, and the operation of a materials laboratory and research on soil stabilization.

A Public Roads' soils engineer worked in a laboratory at Lahore and in the field, promoting the use of available materials in roadbuilding. A very useful pamphlet was prepared to assist villagers in improving their roads by their own labor, using local materials. Laboratory equipment had begun to arrive and Pakistani were being trained in the use of the new apparatus. Quality testing of fine aggregate was carried on for the first time, and 50 approved sources of aggregate were designated. A building was erected and equipped with machine tools for use as a repair shop, and Pakistani were being trained in equipment repair.

Pakistani engineers and machine operators in West Pakistan were being trained in the use of modern machine methods and locally available material on a demonstration construction project which will provide a much needed highway link through the old Baluchistan States Union area.

Activities in the Philippines.—Public Roads has maintained a work group in the Philippines for 10 years. From 1946 to 1952, its principal concern was the reestablishment of an adequate highway organization and the restoration of war-damaged roads and bridges under the Philippine Rehabilitation Act of 1946. Since 1952 the group, acting as highway consultants to the International Cooperation Administration and its predecessor agencies, has continued to assist the Philippine Bureau of Public Highways in its program to provide a useful system of highways and in the construction of development roads in Mindanao. Public Roads has also assisted in a joint United States-Philippine program of barrio or village road construction.

Materials aggregating about $23 million in United States funds have been provided, mostly in the form of construction and maintenance equipment and bridge steel. Included were 153 spans of utility steel trusses ranging in length from 60 to 200 feet, for use in replacement of expensively maintained temporary wooden structures on the Philippine highway system. These semipermanent, single-lane trusses are very valuable in this rapidly developing country where traffic increases frequently require replacement and re-erection elsewhere.

The training program of past years was continued for both engineers and equipment personnel. Roadbuilding equipment specialists gave instructions and demonstrations on the actual operation and maintenance of equipment in 30 provinces and 3 cities.

Highway improvement continued at an accelerated rate. The improvement of present roads and the opening up of settlements and areas heretofore inaccessible will continue to benefit agriculture, mining, irrigation, and water resources, as well as internal and external national defense. During the year, 655 miles of primary highways were improved, and 133 miles were under construction at the close of the year. Completion of 868 miles of barrio (village) roads, with another 604 miles under construction, is bringing new hope to rural people previously isolated by the lack of a transportation network. Highway improvement on the Island of Mindanao, rich in natural resources and agricultural potentialities, was severely hampered by heavy unseasonal rains. Even with these handicaps, 68 miles of highways were completed, making the total to date of 202 miles, with 106 miles under construction on June 30.

Activities in Jordan.—Public Roads has assisted Jordan with its road program since 1952. Construction work during the past year was concentrated on projects initiated in prior years. Two sections on the proposed Jordan primary highway system were under development: A 115-mile east-west route connecting Jerusalem with the Baghdad highway at a point 59 miles east of Amman, and a 59-mile north-south route from the Syrian border near Ramtha to a junction with the Baghdad-Jerusalem east-west route near

Na'ur. Progress in construction was below that anticipated, largely due to disruption during a period of political unrest and disturbance in the area.

Vehicle registration in Jordan during the 4-year period since 1952 has increased 40 percent. Completion of the two previously mentioned routes will facilitate movement of traffic between important industrial, agricultural, and populated centers of Jordan and international trade centers.

The road program has had a large impact on the economy of Jordan through an average employment of 5,000 people in addition to extensive expenditures for equipment, materials, and supplies.

Activities in British Guiana.—On February 4, 1957, an agreement between the Bureau of Public Roads, the International Cooperation Administration, and British Guiana provided for implementing the recommendations made under a previous survey by Public Roads of the highway needs of the country. Consultation and advice is to be provided the Government of British Guiana in establishing a highway organization and initiating construction and maintenance units.

As a result of the previous survey, recommendations of appointments have been made of a chief highway engineer and a soils engineer, and engineers for location, design, construction, and maintenance were being recruited. Crews were surveying the Parika-Bartica and Mahdia-Lethem routes. A testing laboratory was completed and partially equipped and the improvement of the Bartica-Potaro road was started. The operations of the highway department are at present handled by the Director of Public Works.

Activities in Liberia.—A materials engineer was added to the Public Roads staff in Liberia and a modern materials laboratory was being set up. On-the-job training was being carried out in all phases of highway work.

The opening of new roads and the improvement and maintenance of feeder roads in Liberia have given impetus to other programs in such fields as education, public health, and agriculture. Better communications are made possible which aids internal administration.

New construction by contract completed during the fiscal year included 13 miles of asphalt paving, 26 miles of grading, and the construction of 20 structures and approaches on the main highway leading into the interior. Some 14 miles of road were improved in width and surface by maintenance forces using equipment owned by the Liberian Division of Highways.

Approximately 515 miles of primary highways were under machine maintenance and 76 miles of secondary highways were under hand maintenance.

An equipment depot to house all shop and warehouse activities was completed. The Department of Public Works and Utilities also completed a new office building of which the Division of Highways occupies one wing.

Highway Safety

The Bureau of Public Roads was more actively engaged in highway safety during the fiscal year, partly because of new legislation requiring it to make a full study of the problem and report to Congress (as discussed in another section of this report), and partly because of earlier legislation directing it to assist in the promotion of the action program for States and municipalities.

Public Roads is carrying on both requirements in part through increased cooperation with the President's Committee for Traffic Safety. With about 35 other national organizations, it has joined the technical council advisory to the President's Committee, and has utilized the council's research committee as a review board for its special investigation. Public Roads has also participated as a member of the council's public relations committee on highways in the preparation of a special educational campaign by the President's Committee to gain public support for safety-design standards such as controlled access in the construction of the Interstate System.

Public Roads continues to staff the headquarters office of the President's Committee and to provide printing, supplies, travel, and transportation. During the fiscal year, it supported two of the Committee's traffic-safety seminars for State officers of women's and parents' organizations.

In other fields related to safety, Public Roads cooperated with the American Association of Motor Vehicle Administrators in the development of uniform registration procedures and records among the States; and with the National Committee on Uniform Traffic Laws and Ordinances in its continuing studies and promotion of the Uniform Vehicle Code, which provides a reliable guide for use of State legislatures in the development of nationwide uniform traffic regulation.

Administration and Management

In recognition of the increased responsibilities involved in the administration of the Federal-Aid Highway Act of 1956, the Congress enacted legislation approved August 3, 1956, providing that the Bureau of Public Roads be headed by a Federal Highway Administrator appointed by the President by and with the advice and consent of the Senate. On October 12, 1956, the White House announced that when Congress reconvened in January, nomination to the position would be submitted of Mr. Bertram D. Tallamy, Chairman of the New York State Thruway Authority and previously Superintendent of Public Works of New York State. Pending Mr. Tallamy's availability and Senate confirmation, Mr. John A. Volpe, formerly Commissioner of Public Works for Massachusetts, was appointed by the President on October 12 as interim Administrator, and was sworn into office on October 22. He relinquished the position to Mr. Tallamy on February 1, the date of the latter's confirmation by the Senate. Mr. Tallamy was formally sworn into office on February 5.

The same act provided that there shall [continue to] be a Commissioner of Public Roads, appointed by the Secretary of Commerce. Mr. Charles D. Curtiss, Commissioner since January 14, 1955, was confirmed in that position under the new act by Secretary of Commerce Sinclair Weeks.

Actions initiated immediately after the passage of the Federal-Aid Highway Act of 1956 were continued and intensified during Mr. Volpe's interim period of service and thereafter under Mr. Tallamy's direction, to get the huge new program underway and to assure its accelerated progress. A general plan of reorganization of the Bureau of Public Roads to permit more efficient administration of the program was approved. Additional responsibility and authority were delegated to field offices to provide for further streamlining of operations. Policies clearly enunciating actions and duties at all levels of authority were established. Ambitious but realistic goals were established for the States to reach in initiating and carrying out the programs authorized by the legislation.

Stemming from the newly defined policies and operating principles, additional actions of an administrative and managerial nature were initiated. In the previous fiscal year, a basic organization plan was prescribed for the district offices which are located in each State. In the fiscal year 1957, a similar organizational plan was developed and put into effect for the division offices, each of which guides the Federal-aid programs in from 4 to 8 States. To bring the names of the field offices into harmony with terminology used by many other Federal agencies, the divisions became "regions" and districts became "divisions."

Attention was focused during the year on review of the organizational structure of the headquarters office in Washington to complement the field organization. Much was accomplished during the year in the headquarters office reorganization, regrouping of functions, and clarification of responsibilities and authority, and completion of these objectives was set as goals to be accomplished during the fiscal year 1958. The studies underway gave consideration to new concepts of headquarters office responsibilities in terms of providing national leadership in administering the program in all of its ramifications. Changes in organizational nomenclature and titles, and realinement of functions were adopted to conform with recommended organizational patterns and to provide more realistic structural uniformity.

From these actions there emerged five basic groupings of major functions: the office of engineering, the office of operations, the office of administration, the office of research, and the office of the general counsel which became the successor entities to the former engineering, finance and management, research, and legal divisions of the Washington headquarters organization. The titles of the offices explain their general functions except, perhaps, the office of operations, which has responsibility for several functions outside the orbit of the cooperative Federal-State highway programs. Changes were being made in designations of organizational subdivisions, consistent with the basic patterns thus established.

Greater activity and increased Federal participation in the acquisition of rights-of-way dictated the establishment of a separate division to cope with the administrative and engineering aspects of right-of-way matters and related problems, as distinguished from legal aspects. Still another organizational unit was established to carry on developmental work and studies for the purpose of finding and promoting ways in which the results of research from any source can be applied or adapted to Federal, State, and other highway programs. An electronic computer was ordered, and a branch was established to provide electronic and electro-mechanical data processing services and automatic computation facilities for application to procedures and mass data problems.

The need for more effective personnel administration was met by strengthening the responsible organizational unit through appointment of qualified experts in the fields of classification, employee utilization, and training, and through development of improved recruitment, placement, and training techniques. Decentralization of accounting and disbursement functions was accomplished for better fiscal control at operating levels, and as a means of minimizing delays in reimbursing the States to enable them in turn to meet their obligations to contractors.

Substantial savings in administrative costs were realized during the fiscal year from management improvement actions. Additional savings resulting from the technical improvement efforts of Public Roads engineering personnel accrued jointly to the Federal Government and the States.

During consideration of legislation and after the passage of the Federal-Aid Highway Act of 1956, the historic relation between the Federal Government and the States in connection with the Federal-aid program received careful examination by the Congress as well as by Public Roads and State highway administrators. With the completion of the Interstate System authorized as a long-range program and the Federal share of the cost increased to 90 percent, and the regular Federal-aid program greatly enlarged in scope, it was recognized by all concerned that the utmost vigilance would be required in insuring that Federal funds are expended properly and judiciously. Consequently a project examination division was established in the Bureau of Public Roads to audit and spot check both Public Roads and State operations in all aspects of the

Federal-aid program, including engineering, construction, and right-of-way acquisition. The division will ascertain if such operations are in compliance with established policies and procedures, and will make recommendations for corrections of deficiencies, changes in procedures, and improvement of operations.

Public Roads continued to increase the efficiency and productivity of its engineering and administrative personnel by conducting in-service training programs. During the fiscal year, 1,963 Public Roads employees attended conferences which were partially or completely devoted to staff education and development. Also, Public Roads gave 57 of its employees on-the-job training and conducted a junior engineer training program for 76 junior engineers and 48 engineering aids. As the year ended, 72 new college graduates entered the 3–year junior engineer training program.

Development of New Practices

To foster improved and more economical highway practices, and to overcome the problem of the shortage of engineering manpower, Public Roads has explored many fields in its efforts toward development of new and improved methods, practices, equipment, materials, products, and procedures, and to promote the use of such developments into all highway programs.

Electronic computers

An important activity in the past few years has been the development of applications for electronic computers as a means of expediting highway engineering operations and increasing highway engineering productivity. In cooperation with the State highway departments and other organizations, Public Roads has undertaken the development of a library of electronic computer "programs" for the solution of highway engineering problems. A "program" is a detailed set of instructions regarding the feeding of data into the computer, and the sequences of operations to be performed by the machine, in order to obtain the desired solution to a specific problem.

In addition to programs developed by Public Roads, programs have been received from State highway departments, consulting engineers, universities, and many segments of industry, and have been reviewed and tested. All such programs become part of the central library and are available to any highway department or other cooperating agency which has use for them.

Progress has been such that 35 State highway departments have decided to use electronic computers. Most of these, including the Bureau of Public Roads, were accomplishing some of their computations electronically. Others were in the process of buying computers or arranging to have computations performed at one of the computer service centers located in a growing number of cities.

In order to coordinate and disseminate information on these developments and others, Public Roads sponsored two regional conferences during the year, in Atlanta and Los Angeles. The latter conference was attended by nearly 500 highway officials, engineers, contractors, and manufacturers.

In a closely allied project, Public Roads has joined with the Massachusetts Department of Public Works and the Massachusetts Institute of Technology in studies seeking to develop a linkage of photogrammetry and electronic computers into an automatic data processing operation. Such a system would permit a more complete evaluation of the impact of alternate route locations and design features on relative highway construction, maintenance, and operation costs, on relative highway-user benefits, and other economic factors than heretofore possible because of the engineering time required for making such comparisons manually.

Construction

Twenty-five new experimental projects involving Federal-aid funds were undertaken by the States during the year. These projects concerned such timely subjects as reinforced concrete pavement, rubberized asphalt surface and seal treatments, and cement and lime stabilized bases. Approximately 260 experimental projects were under observation during the year. Observation on 35 experimental projects was completed.

Efforts toward improving construction efficiency in the highway industry were continued. Practices in the several States in regard to relocation of utilities effected by construction, the method of handling traffic during construction, and the effect of certain plan and specification details on construction were reviewed. Worthwhile observations and conclusions were disseminated to the States.

A study of equipment requirements for highway construction and maintenance was prepared for the International Road Federation and has been published in three languages by that organization.

A study has been undertaken to develop recommendations to further expedite the highway program through plan simplification, lump-sum bidding, more extensive use of standard plans and specifications, and reduction of unnecessarily restrictive provisions on the methods and equipment employed by highway contractors.

During the latter part of 1954, Public Roads assisted the American Road Builders' Association in the preparation of reports on the ability and readiness of each segment of the highway industry to undertake a greatly expanded highway construction program. The actual launching of the program has greatly increased the value of these studies and during the year the Association, with Public Roads assistance, prepared and issued revised reports.

AASHO Road Test

Previous annual reports have described the AASHO Road Test in Illinois, a substantial cooperative investigation of the performance of concrete and bituminous pavements and highway bridges subjected to varied weights of controlled traffic. The test is being sponsored by the American Association of State Highway Officials and administered by the Highway Research Board. The estimated $20-million cost is being financed by the State highway departments, the Department of Defense, the Automobile Manufacturers Association, the petroleum industry, and the Bureau of Public Roads. In addition, Public Roads is providing personnel, equipment, and services. Bureau engineers have participated in the planning, design, and many technical matters, have developed and built special testing apparatus and equipment, and have performed many laboratory tests of materials.

General direction of all activities is through an advisory committee and special panels for each phase of the undertaking. The project staff has been recruited from highway departments, research organizations, and universities and, with the task force of the Illinois Division of Highways in charge of construction, has constituted a force ranging from 140 to 220 engineers, scientists, and administrators resident on the site of the new administration building between Ottawa and La Salle, Ill.

Grading, drainage, and substructures for bridges and overpass s have been substantially completed during the past fiscal year. Considerable progress was also made in the development of instrumentation and special apparatus to assist in recording measurements and appraising results of the tests.

At the May 17 bid opening in Illinois, only one bid was received for placing of concrete and bituminous paving of the 836 separate test sections included in the 6 test loops. The bid was substantially in excess of the engineers' estimate and was rejected because the amount exceeded the funds available for constructing the project.

At year's end, steps were being taken by the AASHO, the State of Illinois, and Public Roads to seek additional financing, to review specifications with a view to obtaining all possible savings in construction cost without sacrificing research requirements, and to consider proposals designed to increase competition by readvertising the work in a series of lesser contracts.

A June 7 release of the Highway Research Board states that "this unavoidable delay in the start of test traffic can be profitably utilized * * * for further experimentation on the system of electronic instruments which will collect data from the test pavement. In other words, the delay may serve to make the AASHO Road Test an even better experiment."

Financial and Administrative Research

Administrative studies

Work in the field of administrative studies during the year included the following: An organization and management study of the Iowa State Highway Commission, requested by State officials; a study of engineering manpower in cooperation with the Highway Research Board, which will publish the report; a study of the organization of county and local highway agencies; and the revision, as of July 1, 1957, of tables listing directing organizations of State highway departments and salary ranges of principal officials. Technical assistance in management planning was given in pilot studies in individual cities selected by the National Committee on Urban Transportation.

Land acquisition, highway laws, and related studies

Studies of the economic impact of highway improvements on land values and land uses were continued. In addition to their bearing on the problems of highway taxation, these studies are useful in acquainting the public with the effects of highway improvements such as expressway and bypass facilities, in right-of-way acquirement, and in the conduct of public hearings required under the Federal-Aid Highway Act of 1956.

A survey of the salaries of persons engaged in the acquisition of rights-of-way for highways and other public purposes was instituted in cooperation with the Highway Research Board, the American Right-of-Way Association, and the American Association of State Highway Officials. Its purpose is to determine whether such salaries have kept pace with those of other governmental and quasi-governmental organizations.

The study of urban parking problems was continued, as was the service of providing technical assistance on the legal, administrative, financial, and economic phases of establishing parking facilities in municipalities. Technical assistance was also given to State highway departments and other agencies on problems in right-of-way acquisition, roadside protection, and control of highway access.

A preliminary report pertaining to statutory declarations of legislative policy on highways was completed during the year as a part of a comprehensive study of highway laws—a cooperative project of the Highway Research Board and the Bureau of Public Roads. Other reports in process include studies of land acquisition, highway system classification, Federal-aid and intergovernmental relations, and constitutional provisions relating to highway matters.

A program of assistance to States in connection with State highway law surveys was continued.

Highway cost studies

An analysis was made during the year of the life of dollars invested in grading, surfacing, and structures. In this work depreciation rates of the various elements of the highway were derived from data on construction costs and salvage supplied by eight States. Analytical estimates of highway needs in three States were based on the relation between the growth trends in traffic and corresponding growth trends in highway investment. A paper presented at the annual meeting of the Highway Research Board discussed the effect of traffic growth projections upon estimates of highway needs and revenue. An estimate of the annual and cumulative investment in the several road and street systems from 1914 to the present day is now in progress.

High-speed computer programs are being designed for solving certain highway cost research problems. Preliminary trial runs give promise of substantial savings in time and cost. New areas of research will be opened as a result of increased flexibility in arraying cost and investment data and investigating relations between numerous variables.

Production cost studies

Several studies were completed and others continued during the year in research on efficiency and economy in highway construction and maintenance. Three detailed unit cost studies were completed: two on bridge construction and one on grading and paving work. Field work was continued on another unit cost study involving several types of bridges. Four other field studies were completed on equipment time utilization, performance characteristics, and production rates. A special analysis was started on possible savings in cost and time of construction by precasting box culverts.

A 30-minute motion picture, *Lost Production in Highway Construction*, was completed and widely distributed among highway engineering and construction groups. This film briefly covers scraper and shovel excavation, bituminous paving, and portland cement concrete paving. It deals with performance characteristics and significant time losses from typical recurring small delays for several major types of construction equipment. Extensive work was also completed for four additional films of similar nature.

Finance and taxation studies

Work in highway taxation during the year included continuation of the study of so-called third-structure taxes on commercial motor vehicles and the production of a report on the total and average payments, in 1954 and 1955, of State road-user taxes by motor vehicles in different type and weight groups. Consultative assistance was given in State studies of highway finance and taxation in four States. These projects all involved studies of the allocation of highway tax burdens and the development of revenue structures adequate to finance expanded highway programs.

During the year the annual *Highway Statistics* volume (for 1955) was published. Another publication, *Highway Statistics, Summary to 1955*, was nearing completion. This bulletin will report motor vehicle, motor fuel, taxation, finance, and mileage data from the earliest years of record through 1955.

The continued analysis of local road and street finance data reported annually by the States was productive of a report of receipts, disbursements, and debt status of all governmental units for highway purposes in the years 1947–56, and of State-by-State tables of local rural and urban highway finances. Further progress was made on an urban street finance bulletin covering the years 1937–53. A review of developments in highway finance during 1956 was also prepared and published.

Technical assistance was given in various forms to the National Committee on Urban Transportation in its work on urban transportation planning.

Highway Transport Research

Road inventory and mapping

To provide a continuing basis for studying the needs and deficiencies of the entire road network, data were obtained in a continuing inventory process in 42 States, Hawaii, and Puerto Rico. This information is used in appraising the performance and adequacy of the several highway systems. Work of inventorying highway conditions, together with business, industrial, and other developments along them, was accomplished by State highway departments with Federal assistance.

Mapping activities resulting from State planning surveys included the preparation and publication of 19 State general highway maps, 37 State traffic maps, 295 county general highway maps, 383 county traffic maps, 731 maps of incorporated places, 40 city traffic maps, and 103 urban area maps.

Traffic volume, classification, and weight information

The most intensive traffic counting, weighing, and classification programs undertaken since the original surveys in 1936 were inaugurated this year. Information is being collected to show the vehicle-miles of travel by type of vehicle on the Federal-aid Interstate, primary, and secondary systems and on all other mileage for both rural highways and urban streets. Never before has such a complete schedule of traffic counts been planned in urban areas.

At several hundred thousand stations, traffic will be mechanically counted from 24 to 96 or more hours throughout the country on the Federal-aid systems and other roads, both rural and urban. These counts are in addition to those at the more than 1,400 locations where traffic is counted continuously by automatic traffic recorders.

Vehicle weight information is to be obtained at approximately 1,800 weight stations throughout the country to furnish factual records concerning the frequency of axle loads of various weights and total weights of vehicles on the Federal-aid systems, both rural and urban. This will supplement the 500 regular stations that are operated yearly, mostly on main rural highways.

At the close of the fiscal year, 6,300 classification stations had been selected in 36 States, and selection of stations in the remaining States, Alaska, Hawaii, and Puerto Rico was underway. Most of these stations will be operated for 24 hours in each season. Detailed type-of-vehicle information will be recorded at these stations.

From data collected during the year, it was found that rural travel in the calendar year 1956 had increased 4.8 percent over 1955, while the more slowly growing travel in cities increased 3.1 percent. All traffic, rural and urban, increased 4.0 percent.

Preliminary analysis of truck-weight data indicates that truck travel on main rural roads had increased 5.5 percent and ton-miles of cargo transported on these roads had increased 11.1 percent. This substantial change resulted from both an increase in the load carried and from an increase in the frequency of loaded trucks.

Statistical techniques developed in the Washington office for the objective evaluation of efficiency of traffic-counting procedures were applied in eight

States during the year, with substantial improvements in efficiency resulting. Sample sizes for truck weighing were determined and research was conducted to establish the duration of traffic counts and means of obtaining data on traffic pattern variations for maximum efficiency. Investigations were begun into the possibility of improvement of techniques in origin and destination sampling methods.

Traffic studies in cities

During the year comprehensive home-interview studies of travel and vehicle use were conducted in 14 metropolitan areas, of which 4 were repeat surveys. Comprehensive studies, to date, include 123 areas plus 8 repeat surveys.

Field work for the largest travel and vehicle-use study ever undertaken was completed in the Chicago area and analysis of the data is now underway. In this study Public Roads is participating in the development of electronic equipment, using the cathode-ray tube in conjunction with photographic equipment and a high-speed computer, to present a composite picture of the urban traffic pattern through mechanical analyses.

Plans were being made to launch large-scale studies in the Philadelphia and Pittsburgh areas, similar to that underway in Chicago.

In the recent surveys, land use is being correlated with trip generation, and this should provide a means to keep the data up to date for the years between repeat studies, and aid greatly in projecting them into the future. With the aid of electronic equipment, research is underway to test formulae and develop factors for use in forecasting future travel.

Urban highway planning

The comprehensive metropolitan area origin-and-destination traffic surveys continue to provide valuable basic research data with which to investigate and develop urban highway planning techniques. Information from the 1948 and 1955 surveys of Washington, D. C., has been compared to test forecasts of trips per dwelling unit with automobile ownership and other related factors. Comparative analyses of numerous household data for the two periods indicate that travel patterns and trends are related to the trends in population, dwelling units, automobiles owned, and various ratios of these factors. Other studies have correlated work trips to industrial areas with the labor force employed there. Results of analytical studies were provided for estimating and forecasting trip ends in residential land-use areas. Additional studies are continuing on trip correlation with other types of land use.

An increasing number of studies were started in various States to develop data by which the impact of highway improvements upon urban areas can be determined. Such studies include measurement and correlation of the rate of growth of land development and of traffic as affected by new highway facilities. These studies should improve traffic forecasting results. Assistance to various States and urban areas was provided, particularly in the coordination of urban highway planning and analysis results.

Motor-vehicle-use studies

Studies of motor-vehicle use, conducted in cooperation with the State highway departments, were continued during the year. These studies provide such information as estimates of total vehicle travel, classified according to rural and urban ownership of vehicles, proportion of travel on the various highway systems, methods of transportation used for home-to-work travel, and frequency and length of trips. The information is useful in the solution of highway planning and financing problems.

At the close of the fiscal year, field work for such studies had been completed in 21 States and Hawaii, was in progress in 2 additional States, and preliminary arrangements for a study had been made in another State.

Analysis of information contained in 19 reports was in progress. From study of some of these reports it was found that approximately 92 percent of all passenger-car and truck travel was performed in the State of residence. The average length of all passenger-car trips was 8.5 miles, and for all truck trips, 10.1 miles. Considerable range in length of one-way trips was found when trips were grouped by purposes. Trips for educational, civic, and religious purposes averaged 4.4 miles, trips for family business averaged 5.4 miles, those related to earning a living averaged 7.9 miles, and social and recreational trips, including vacation trips, averaged 15.6 miles. The average occupancy per passenger-car trip ranged from 1.3 persons for trips pertaining to earning a living to 2.5 for social and recreational trips.

Economic cost of motor-vehicle accidents

Comprehensive studies of the economic cost of motor-vehicle accidents were underway in three States. For the first time, the direct annual costs of traffic accidents to passenger-car owners and the occupants and pedestrians involved have been determined in detail, for an entire State (Massachusetts). These costs were correlated with such items as highway systems, population, size of city and rural areas, age of vehicle, sex of driver, and other related items. The direct costs consist of costs of hospitalization, medical and dental expenses, ambulance costs, property damage costs, value of time lost from income-producing work, legal and court costs, damages awarded in excess of all other direct costs, and minor miscellaneous costs. These annual direct costs in Massachusetts, totaling $57 million, amounted to $46 per passenger car registered in the State.

A survey of similar costs resulting from operation of trucks was underway in Massachusetts, as well as a study of the indirect costs of all highway accidents. The undertaking of similar comprehensive studies was under consideration in several other States.

Highway capacity research

Revision of the widely used *Highway Capacity Manual*, published by Public Roads in 1950, has been considered desirable to present capacity criteria based upon recent field data of greater coverage than the original studies.

As part of this project, a major study of intersection capacities was underway. Through the cooperation of State and city traffic officials throughout the country, data have been gathered during the past 2 years covering peak-hour traffic volumes and operational features at 530 heavily traveled intersections in 86 cities in 37 States. From these data, some 1,100 approach roadways have been selected for complete analysis. Preliminary results obtained thus far indicate that the capacities at intersections of wide streets have improved or are somewhat greater than previously indicated, while narrow streets show little change from the original values. From the results of nine extensive analyses underway, detailed intersection capacity determination procedures will be developed for entire urban street systems under various types of traffic signal control.

Also in connection with this project, a study of expressway and ramp traffic volumes and the relations between the two at merging areas was underway. Traffic officials in several cities and States are cooperating on this study. On a 2-mile section of the Shirley Memorial Highway, a major freeway into Washington, D. C., from nearby Virginia, a special study of this type was conducted during the year in conjunction with an attempt to alleviate rush-hour congestion. Experimental lane control, using signs and traffic cones, was put into effect, and traffic counts by lane were made under both "before" and "after" conditions, providing data on the merging capacities of ramp-expressway connections under varying conditions.

Reported during the year was a technique developed for using the results of research conducted over the past several years in relating the traffic service or capacity of highways including freeways to such variable items as design speed, possible operating speeds, alinement, profile, length of grades, and percentage of trucks.

Accident experience related to control of access

Over a period of several years, data have been compiled for accidents on 2,100 miles of highway, relating accident experience with the degree of access control maintained. During the year, this information was used to provide up-to-date statistics on comparative accident, fatality, and injury rates on the various highway types, in urban, suburban, and rural areas. These figures indicate that the provision of full control of access reduces both the accident and fatality rates to between one-third and one-half of the values for roads having no access control. Additional analyses of the data, involving factors such as manner of accident, speed, and traffic volume, were underway.

Roadside facilities along controlled-access highways

Motorists on controlled-access highways must occasionally leave the highway and stop in order to obtain fuel, food, or other roadside services. In order to acquire information on the needs and desires of drivers for these roadside services, a pilot study has been undertaken in cooperation with the Virginia Department of Highways.

The Shirley Memorial Highway, a 4–lane freeway located near Washington, D. C., was selected for the study. Nearly 2,000 drivers interviewed on the highway itself and about 900 other drivers were interviewed as they purchased gasoline at 7 service stations located near the interchanges. Information was collected on the amount of gasoline purchased, type, make, and year of vehicle, trip origin and destination, frequency of use of the highway, and other pertinent items. This information was being analyzed in detail at the close of the year.

Equipment development

Special electronic equipment for recording driver behavior and other information needed for highway capacity research was completed during the fiscal year. This equipment automatically records the speed and transverse position of each vehicle by employing new electronic techniques. The recordings are made both in printed form and on a 5–channel punched tape which can be used to make punch cards or can be inserted in a high-speed computer for analysis. This equipment is capable of recording information for all vehicles in four traffic lanes, regardless of their speeds and headways. It has been employed for special studies on the freeways in Texas, and during the next few months it will be used for research in driver behavior, capacity, and geometric design on the freeways in Detroit, Chicago, San Francisco, and Los Angeles.

Brake research

At the request of the Interstate Commerce Commission, the Bureau of Public Roads agreed to participate in a comprehensive study of emergency braking systems of commercial motor-vehicle combinations. Tests are to be conducted to obtain information which will resolve substantial areas of controversy concerning the safeguards in motor-vehicle braking systems necessary to prevent the recurrence of "runaway" accidents on the highways. The study is being undertaken with the advice and assistance of an advisory committee constituted of representatives of other government agencies and vitally interested nongovernmental organizations.

Public Roads has prepared a program of study, agreed to by the advisory committee, providing for three phases of tests. The first phase consists of laboratory tests to ascertain the magnitude of delays inherent in various power-braking systems, and to determine which components of various emergency braking systems operate compatibly with one another. The second phase consists of actual vehicle stopping tests, including stops made under conditions of simulated brake failure. The third phase comprises service tests to determine the reliability and the need for maintenance of various emergency braking systems. The program contemplates use of both government-owned and privately owned facilities for the tests. Braking equipment and vehicles are to be provided by manufacturers and by vehicle operators. The first phase of the study is to begin during the summer of 1957.

Economics of motor-vehicle size and weight

For a systematic determination of optimum size and weight limits of motor-freight vehicles for highways of the future, it is necessary to evaluate jointly the economic factors relating to the vehicle and the highway. The economic factors include the costs of owning, maintaining, and operating various types and capacities of vehicles, plus such costs of constructing and maintaining compatible highway facilities as may be properly assigned to freight vehicles.

Two major questions ultimately must be resolved: What are optimum size and weight specifications that will result in the lowest overall cost of highway freight transportation? Are such optimum size and weight specifications applicable uniformly in all States or regions of the Nation?

In collaboration with the Highway Research Board committee on economics of motor-vehicle size and weight, research programs on two phases of this problem have been underway. With the cooperative assistance of the State highway departments, vehicular operating costs and other data have been collected by personal interviews with motor carriers throughout the country. Except for some special studies that may be made during the next 6 months, this field work was completed. Nearly 4,700 carriers were contacted in 36 States and the District of Columbia. Approximately 17 percent of these carriers had records which were useful to the study. Analysis of these data was in process.

A second phase, now underway, is a study of the shipping weight characteristics and the tonnage volumes of the various classes of commodities that are transported by highway in the United States. The study of shipping densities and respective annual tonnages for commodities transported in line-haul highway freight service will show the relative amounts of freight of each of the significant density groups that are moved by highway. These data should indicate the maximum weight limits that need be contemplated for maximum economy, and the degree to which freight carriers and shippers may use to advantage any given level of vehicle size and weight.

Hydraulic Research

The basic purpose of hydraulic research is to provide the means whereby the highway engineer can design and build highways which will be reasonably safe from flooding during severe storms. The first problem, requiring extensive study of hydrology, is to estimate how big the flood may be. Having arrived at estimates of probable peak rates of flow, the second problem is to design culverts, bridges, and other structures to handle such flows safely and without excessive interference with use of the highway.

The hydrologic research conducted by Public Roads utilizes, primarily, the basic data provided in the records of stream flow published by the U. S. Geological Survey. These records, while providing fairly good coverage for the larger streams, include very few of the smaller ones. Consequently, it has been necessary to derive from the few available records relations which can be applied to estimate probable floods on the thousands of ungaged streams crossed by highways. Public Roads' efforts have been directed toward discovering the more significant factors that affect the peak rates of flow and expressing these in mathematical or graphical forms adapted to use by highway engineers. The development of techniques has about reached the point where routine processing of data on a nationwide basis can begin.

Public Roads has enlisted the cooperation of Stanford University and the Agricultural Research Service of the Department of Agriculture in a study of rainfall and runoff records on small rural watersheds. Runoff from small watersheds varies widely with land use, and the engineer needs to anticipate how probable developments along highway routes are going to change the flood peaks. It is hoped that an intensive study of these records will lead to development of a method of estimating peak rates of runoff on culvert-size watersheds. Existing methods are known to be inadequate.

Standards for the Interstate System require that culverts and bridges be designed to accommodate floods at least as great as that for a 50-year frequency. Consequently, analysis of flood data must proceed as rapidly as possible, and knowledge of how flood waters pass through highway structures must be perfected. During the year a method for the hydraulic design of bridges has been developed from an investigation using small-scale hydraulic models. The experimental work, begun in 1954, was done by the laboratory of Colorado State University at Fort Collins. The reliability of the method has been verified by checking against U. S. Geological Survey field measurements of backwater caused by bridges. The new experimental data provide a simple method for the engineer to compute how long a bridge needs to be in order to pass a given flood without causing an excessive increase in the river stage upstream from the bridge, that being the principal criterion. The methods previously used, while basically sound, suffered from lack of experimental data and did not take into consideration all the significant factors.

Scour of erodible streambeds at culvert outlets has been under investigation at Colorado State University as a cooperative agreement with Public Roads. Maintenance engineers have long struggled to save culvert headwalls from being engulfed in enlarging scour holes, particularly where there was a drop from the end of the culvert to the normal streambed. The culvert may not have been built that way but the channel lowered itself with the passage of years. Encouraging results have been obtained by the simple process of placing a well-graded gravel in the scour hole. Surprisingly, this seems to prevent the hole from getting any larger. Further work is needed to establish criteria useful to the field engineer.

The University of Iowa has embarked on an investigation of scour around bridge abutments under an agreement with the Iowa State Highway Commission financed as a Federal-aid project. The objective has been to discover how relatively sediment-free water on a flood plain affects the scour process at a bridge over a main channel which is carrying a sediment load. Research previously conducted at the same laboratory had shown that scour holes around piers ceased enlarging once the sediment brought in by the stream equalled the quantity being swept out. The addition of a large quantity of sediment-free water from outside the main channel may greatly change the scour phenomenon at the bridge abutment.

For the past several years Public Roads has been cooperating with the National Bureau of Standards in extensive research on performance characteristics of highway culverts. Exceedingly important results have been obtained, not only with respect to the highway problem but also in regard to interpretation of small-scale model tests. The thoroughgoing tests by NBS have necessitated discarding certain results of a number of studies by others made previously. Phases of the work completed during the year show that general reproducibility of results from model tests of culverts cannot be obtained without full consideration and control of approach-flow conditions. This applies also to prediction of how a full-size culvert will perform.

It was concluded, however, that a type of culvert entrance can be evolved which will be insensitive to approach conditions. Such a culvert would be "foolproof" in operation and adapted to simple design procedures. Existing culvert types, once the entrance becomes submerged, are unpredictable in operation. The barrel may flow full or only partly full and large differences in ponded water elevation can exist if it does one or the other. With this uncertainty the designer must choose the most adverse situation to be safe. As a result the culvert may be larger than needed if the barrel capacity could be fully utilized. Consequently, there is ample justification for development of an improved design for culvert entrances. When the geometric characteristics are known, industry will be invited to collaborate in developing commerically feasible end sections for the common types of pipe culverts.

Modern highway construction penetrating into and through cities involves elaborate underground systems of storm drains. Despite the many years that cities have been building storm sewers, very little is known about the hydraulic characteristics of their operation. Public Roads, in cooperation with the Missouri State Highway Department, has sponsored research on one of the unknowns, namely, the energy losses which occur at junctions and manholes. Engineers have known how big a pipe needs to be but not how to get the water through a manhole, especially when a major change in direction was required. The study has been done at the University of Missouri during the past 3 years and a final report is in preparation. It has been found that losses have been grossly underestimated. This may account for many cases of flooded streets.

Public Roads is disseminating the new developments in hydraulic design through in-service training of its own personnel, preparation of design manuals, and conferences on hydraulic design with State personnel.

Physical Research

The physical research of the Bureau of Public Roads has for its goal, development of the best use of materials and the employment of the best practices for building durable highways in an economical manner. Many of the studies are directly related to problems which have confronted those actively engaged in construction. The expanded highway program has increased both the number and urgency of such problems by causing the rapid depletion of top quality aggregates in some localities, by providing an incentive for the production and use of new materials, and creating the need for more rapid methods of construction. Participation of Public Roads in studies of these matters promises an impartial approach to highway problems which is valued by State highway departments and commercial interests alike.

Soil studies

The evaluation of pavement design and performance with respect to different soil and environmental conditions continues to be a major concern of the highway engineer. A cooperative study designed to obtain basic data needed for such evaluation was continued with the Oklahoma State Highway Department, which has prepared a report describing the in-place soil units on which 321 miles of flexible pavement have been built. A cooperative study was started with the South Dakota State Highway Commission to relate the condition of about 300 miles of flexible pavement to construction and maintenance costs, traffic, and environmental factors. The selected mileage is representative of about 1,000 miles of pavement constructed in the last 10 years in areas having similar soil and climatic conditions.

Considerable attention has been given to the development of methods for improving plastic soils and other earthly materials having low strength for use in highways and similar engineering works. A cooperative research program has been continued with several chemical manufacturing companies for the purpose of developing and evaluating chemicals for the stabilization of clayey and silty soils. A cooperative study with the West Virginia State Road Commission was initiated to determine the usefulness of fly ash, particularly in combination with lime, for stabilizing soil and soil aggregates. Laboratory studies were also made to determine the extent to which lime reduced the plasticity and increased the strength of plastic soils. Tests were conducted to determine the effectiveness of a commercial material in facilitating the compaction of soils.

Studies to develop information useful in planning soil and materials surveys were extended. In a cooperative materials survey recently started in North Dakota, aerial photographs and other available sources of information were used to determine the location at which field exploration for aggregates should be made. Electrical resistivity equipment was constructed to assist in the field exploration. An engineering soil survey in Rhode Island was completed and organization for a cooperative materials survey in West Virginia was begun. Cooperation with the State highway departments of Illinois and Maine in the development of engineering soil reports and maps was continued.

A nationwide survey of soils was continued in cooperation with the Soil Conservation Service of the U. S. Department of Agriculture. Reports covering the engineering application of soil survey information were prepared for inclusion in agricultural soil survey bulletins for 5 counties, and arrangements have been made for the production of similar engineering chapters in 11 other county soil survey bulletins. Samples of soil on which engineering test data will be collected were received from 25 additional counties or other areas located in 17 States and Alaska, making a total of 83 counties or areas represented in this program to date. Information regarding those soil series which are likely to be sources of sand and gravel was obtained from each State and will be made available to highway engineers.

Another cooperative study with the Soil Conservation Service to determine the engineering characteristics of the major soil series of the United States was continued. In this program the in-place (pedologic) characteristics of the soil units have been correlated with data determined on representative soil samples in the laboratory, such as clay mineral analyses and classification, compaction, strength, and bearing capacity test results.

To facilitate the evaluation of soils for highway purposes, new equipment and tests have been developed. A rapid method of test involving the quantitative determination of the glycerol retention of clay was developed for measuring the surface area and estimating the content of expanding clay minerals in soil clays. Equipment was constructed for determining the specific gravity of soils by means of a combination vibration-vacuum method. A chart based on mechanical analysis and plasticity data has been developed for predicting the optimum moisture content that is determined in the laboratory moisture-density test, thus reducing the time required for the determination.

Bituminous materials and mixtures

The quality of petroleum asphalt is affected both by the source of the crude petroleum and the method of refinement. Technological advances in the refining of asphaltic road materials create a need for periodic evaluation of the various products being marketed. To obtain such information, Public Roads has obtained over 300 samples of asphalt from various refineries throughout the United States. These samples have been subjected to the standard tests required by most specifications and will also be tested by special procedures. The data now available have proven useful to Governmental agencies in preparing new specifications and evaluating new test methods for such asphaltic materials.

It is expected that in some localities the supply of top quality aggregates will be insufficient to meet the needs of the expanded highway program. Studies have been undertaken to develop ways of utilizing aggregates that would normally be considered inferior for bituminous construction.

The use of additives to assist in coating aggregates with bituminous material in the presence of moisture and to prevent stripping of the bituminous film from the aggregate in service has become common practice. Public Roads has maintained a continual testing program to evaluate new materials of this type. Tests were recently completed on 13 such products, most of which are now specially designed to be chemically stable when used in hot asphalt.

Studies have been made to correlate the properties of bituminous mixtures and their component materials, as determined by laboratory test, with their service behavior in the road. A report has been prepared covering an experimental sheet asphalt pavement laid 19 years ago on Connecticut Avenue in Washington, D. C. This report emphasizes the importance of adequate temperature control during the mixing operation, since about 30 percent of the total hardening taking place during the entire 19 years of service occurred during the mixing process. Cooperative studies are also in progress with the Maryland State Roads Commission covering sections of 6 projects, ranging in age from 1 to 10 years.

Studies have been continued for the purpose of standardizing and improving test methods for bituminous materials and mixtures. A program of testing rubber-asphalt joint sealers for concrete pavements was conducted in cooperation with the Highway Research Board. Cooperative work was also done on the thin-film oven test with committees of the American Society for Testing Materials and State highway department laboratories. A series of tests have been conducted with the North Carolina State Highway and Public Works Commission laboratory on the method of molding test specimens of bituminous mixtures in the laboratory. Since the procedures studied are used in connection with the design of bituminous mixtures for pavement construction, the changes found desirable by this investigation will result in better control of construction operations and more efficient design of bituminous pavements.

Paints

An investigation of rust-inhibitive primer paints for steel has been completed and a report has been prepared. The results showed that under extreme weathering conditions, prior to the application of the field coats, good service may be obtained with a primer containing a red lead-iron oxide pigment and a vehicle containing linseed oil and alkyd resin in the ratio of 3 to 1. Vehicles with much larger proportions of linseed oil as well as ordinary red lead-linseed oil paints showed less resistance to weathering.

Cement, aggregates, and concrete

The expansion of portland cement concrete resulting from the chemical attack of some aggregates by the constituents of cement is a problem which continues to require study. There is increasing evidence that detrimental expansion of concrete can result from other types of cement-aggregate reaction than that caused primarily by the alkalies in cement. However, the recent identification of alkali-aggregate reaction as the cause of disintegration in a concrete pavement near Washington, D. C., has added another area to those locations in the United States where this particular phase of the cement-aggregate reaction problem is known to exist. Research on the Alkali-aggregate reaction has been directed toward improvement in methods of evaluating aggregate in this regard. A report has been prepared on a study of the degree of correlation between a quick chemical test and mortar bar tests for determining the potential reactivity of concrete aggregates. The results showed that the chemical test did not always yield reliable results when certain carbonate minerals were present in the aggregate. On the other hand, extremely reactive materials would be more certain to be indicated by the chemical test than by the mortar bar test.

In addition to the alkali-aggregate reaction, many other natural processes which shorten the service life of concrete structures are associated with the entrance of water into the concrete matrix. A practical means of excluding water from the concrete would therefore extend the service life of many structures subject to deterioration. A program of exposure tests has been initiated to study the relative suitablity of various preparations for waterproofing concrete. The general types of coatings being studied are linseed oil paints, rubber base paints, silicones, stabilized rubber latex, and poly-plastics of the thermosetting type. Test panels subjected to 6 months of natural weathering indicate that the rubber-base paints and stabilized rubber-latex compounds do not have sufficient durability for this purpose.

An investigation of methods for protecting concrete pavements from the destructive action of calcium chloride used for ice removal was also continued. In addition to air-entrainment, this program includes a study of the effect of applying various preparations, such as those containing silicones or resins, to the surface of the concrete. Although air-entrainment has been proven to give increased durability to the concrete, the use of surface coatings may have additional value in protecting against scaling caused by chloride salts.

Many State highway agencies have experienced difficulty in controlling concrete operations as a result of the nonuniformity of the type I cement produced at some plants. In the belief that restrictions on the chemical composition of cement would promote uniformity of physical characteristics, some highway agencies have resorted to the use of type II cement entirely, while others have imposed chemical limits in addition to those normally required for type I cement. An extensive series of tests on different shipments of cement from a single plant were continued in an attempt to isolate the causes for variation in strength-producing properties. The results to date indicate that close control of compound composition cannot be depended upon to give cements of uniform physical characteristics.

Present specifications for portland cement do not contain limits regarding shrinkage although this property has an important effect on the dimensional changes and initial cracking tendencies of concrete as drying takes place. Shrinkage data have been collected on a number of cements by measuring the contraction of unrestrained neat cement specimens and the time required for restrained specimens to crack during the early stages of drying. These data will be studied to determine whether such information can be related to the performance of cement in concrete.

Research has been performed for the purpose of improving the method of making several specific determinations in the chemical analysis of portland and portland blast-furnace slag cements. A study of the insoluble residue determination of cement was completed. A report has been prepared recommending modifications of the present American Society for Testing Materials procedure which would increase the reproducibility and reliability of the test results. Cooperative studies with committees of the ASTM have been conducted on the test for loss on ignition of portland blast-furnace slag cement and the free lime determination of portland cement. The usual procedure for determining loss on ignition gives unreliable results when applied to portland blast-furnace slag cement because of the sulfide minerals present. Preliminary indications are that reliable results can be obtained by modifying the procedure and applying a correction.

The use of such lightweight aggregates as expanded clay or shale in concrete for highways has been largely confined in the past to decks of highway bridges which were not subject to traffic abrasion. The proposal to use such materials in the surface course of concrete pavement resulted in an investigation to determine those methods of test which would best measure the effect of such aggregates on the abrasion resistance of concrete. Expanded clay or shale aggregates from nine different sources have been subjected to various physical tests, with special attention being given to modifications of the Los Angeles and Deval abrasion tests. The results of these tests will be evaluated by comparison with (1) performance of expanded shale aggregate in an experimental concrete pavement in Texas, (2) performance of several bridge decks which have been subjected to surface abrasion, and (3) abrasion tests of concrete specimens.

The development or improvement of methods of testing natural aggregates has continued. A study of the present mortar strength test for natural fine aggregates for use in concrete has been nearly completed. A program of tests comparing the relative severity of several freezing and thawing procedures on aggregates has been continued. The freezing schedules used in these tests are such that they can be maintained with a home-type deep freeze unit, and therefore it would be financially feasible for most laboratories to obtain such apparatus.

An investigation has been started pertaining to the use of admixtures which retard the setting time of concrete. Such materials, known as "retarders," are being used with increasing frequency to alleviate some of the difficulties of hot-weather concreting operations, to permit the use of revibration in multiple lift construction of concrete walls, and to permit longer hauls of central-mixed concrete. Retarders which also act as water reducing agents in concrete have been advocated for obtaining the high strengths required for prestressed concrete without resorting to the use of exceptionally high cement contents. In this study the effect of 27 commercially produced retarders on the strength and durability of concrete is being determined. A study of methods for measuring retardation of setting time has also been included in this program in order to provide information for the preparation of specifications for retarders.

The investigation of the use of portland blast-furnace slag cements in concrete was continued. Tests have been made comparing the properties of concretes prepared with this type of cement and portland cement. The concrete containing the slag cement usually had lower strength at ages less than 28 days than the concrete made with portland cement. At later ages the concrete prepared with the slag cement generally had the greater strength. The durability and other properties of the concrete made with slag cement were satisfactory. A progress report of these tests to an age of 90 days was presented at the Highway Research Board annual meeting.

A study of the use of fly ash as a replacement for portland blast-furnace slag cement in concrete has been started. Since the manufacture of portland blast-furnace slag cement involves a partial replacement of portland cement with blast-furnace slag, there has been some concern that the replacement of slag cement with fly ash may reduce the amount of portland cement present in the concrete below that necessary to produce concrete of adequate strength and durability. The results obtained to date indicate that with proper design the effect of replacing a portion of the slag cement with fly ash will be similar to that resulting from the same replacement of portland cement.

A study of the durability of concrete was continued. This work is based on outdoor exposure of concrete specimens at Washintgon, D. C., Treat Island, Maine, Cape Cod, Mass., and Saugerties, N. Y., and experimental pavement slabs at Wellsville, N. Y. Annual inspections are made to determine the condition of the specimens, some of which have been exposed for 12 years. The most definite finding of this study is the improved durability which air-entrainment gives to concrete.

A cooperative investigation with 12 other laboratories, having the purpose of appraising the 4 American Society for Testing Materials methods of conducting freezing and thawing tests of concrete, was completed. This study was conducted under the auspices of the Highway Research Board and therefore the test results have been submitted to that organization for analysis and reporting. A preliminary indication of this study is that the fast freezing and thawing in water method is superior to the other procedures as a method of test.

Recent interest in materials and methods for capping concrete cylinders for the compression test has been occasioned by the relatively high compressive strengths that are commonly required for prestressed concrete as compared to regular concrete. During the year, data were obtained regarding the strength of various capping materials which are now permitted by specifications of the American Society for Testing Materials and the American Association of State Highway Officials. This information has been incorporated in a report covering the study of capping procedures which was completed last year.

Complete information regarding the quality of concrete requires a knowledge of its air content. Because the accepted methods of obtaining this information on hardened concrete are time-consuming and tedious, a cooperative study was arranged with the Illinois Division of Highways to investigate the accuracy and practicability of a method using pressures up to 5,000 pounds per square inch. Apparatus for this work is now being built to test specimens similar to the 6- by 12-inch cylinders used for the standard compressive strength test.

Study of a method for determining the indirect tensile strength of concrete cylinders was continued. Since the usual flexural test of beams has been severely criticized when used as a control test, the indirect tension test would be a welcome substitute if it is found to provide equivalent information. Considerable data have been accumulated comparing the values for indirect tension with those for compressive and flexural strengths of concrete. In addition, various methods of applying the load to the side of the cylinder have been investigated.

Geophysical methods for subsurface exploration

Inauguration of the huge highway building program has intensified interest in the application of geophysical methods of subsurface exploration to highway engineering problems. As a result of Public Roads studies, the capabilities of these methods in this field are well established. The methods of exploration are relatively inexpensive yet furnish much useful information on subsurface formations and sources of construction materials.

During the year, Public Roads has responded to requests from 11 States for assistance in subsurface exploration work requiring geophysical methods. Five States and the Territory of Hawaii have acquired earth-resistivity equipment during that period, making a total of 30 States that are so equipped. Public Roads also makes extensive use of these methods on road work in the National parks and on the Inter-American Highway. Training in the use of these methods was given personnel of 10 State highway departments and 5 foreign countries during the year.

Structural design of pavements

Participation has continued in a number of cooperative research projects with the purpose of developing the useful information on the structural design of pavements.

The cooperative load deflection study of certain high-type bituminous pavements in Maryland has been continued. Comprehensive series of tests were completed during the fiscal year. The data obtained prior to 1957 were analyzed and reported at the last meeting of the Highway Research Board.

A laboratory study of the structural characteristics of doweled joints for concrete pavements, using special testing machines designed for the purpose, has been in progress for some time. This research was concerned primarily with the influence of dowel diameter, dowel length, and width of joint opening on the structural capacity of the load transfer system. The program has been completed and a comprehensive report has been prepared for publication.

Cooperative studies concerning the performance of continuous longitudinal steel reinforcement in concrete pavements have been continued with several State highway agencies. Such pavements are characterized by almost complete absence of transverse joints with certain resulting advantages, such as smoother surfaces and less leakage of water to the subgrade. Other characteristics, such as increased cracking, are less desirable and are being evaluated by study of an experimental pavement in Indiana built in 1938, one built in Illinois about 10 years ago, and one built in Pennsylvania last year. Plans have been made for the construction of similar experimental pavements to study this problem in Maryland and Virginia.

Road-surface research

The smoothness and slipperiness of pavement surfaces are characteristics which concern the traveling public greatly. The skid resistance of pavements, especially, is a subject of growing importance to highway safety as traffic density and vehicle speeds increase. Since adequate control of this characteristic requires dependable methods for its evaluation, experimental equipment has been designed and constructed for measuring the skid resistance offered by different pavement surfaces under various conditions. Research has also continued toward the improvement of the road roughness indicator developed some time ago and now being used by a large number of State and municipal agencies as well as several foreign governments.

Bridges

The program of cooperative tests to determine the structural action of highway bridges under moving vehicular loads has been continued with the testing of two bridges in Nebraska and two in Iowa. As in previous work, the State highway departments and Public Roads jointly participated in the field work and the States involved are presently reducing and analyzing the field data for reports to be published later. Public Roads is assisting the States in reducing the field data from analog to digital form, using data reduction equipment mentioned in last year's report as a means for conserving engineers' time.

As an extension of the cooperative investigation of the aerodynamic behavior of suspension bridges carried on at the University of Washington for several years, Public Roads has constructed a wind tunnel at its Langley Research Station in Fairfax County, Va. The tunnel is being instrumented for early use and will be especially suited to studies of aerodynamic problems encountered in highway engineering, particularly in connection with suspension bridges.

Errata

The *Annual Report of the Bureau of Public Roads, Fiscal Year 1956*, requires a revision in the legend of one of the tables included in the appendix. In the list of tables appearing on page 43, the legend for table 8 "Apportionment of Federal-aid highway funds authorized for the fiscal year ending June 30, 1956 * * *" should be corrected to read "* * * for the fiscal year ending June 30, 1957. * * *" The corresponding change should also be made on page 54.

Appendix

LIST OF TABLES

Page

1. Summaries of programs approved and work completed in the fiscal year 1957, by class of highway and by fund 58
2. Projects under construction or plans approved on June 30, 1957, by class of highway and by fund 59
3. Projects financed with Federal-aid funds programed during the fiscal year ended June 30, 1957, by State 60
4. Projects involving Federal funds awarded to contract during the fiscal year ended June 30, 1957, by program and by State 62
5. Status of Federal-aid projects as of June 30, 1957, and projects completed during the fiscal year 64
6. Mileage of Federal-aid highway projects completed during fiscal year 1957, by program and by number of lanes 66
7. Lane classification of mileage of Federal-aid highway projects completed during fiscal year 1957, by class of fund 67
8. Apportionment of Federal-aid highway funds authorized for the fiscal year ending June 30, 1958, under the Federal-Aid Highway Act of 1956 68
9. Federal highway funds paid by Bureau of Public Roads during fiscal year ended June 30, 1957, by program and by State 70
10. Balances of Federal-aid funds available to States for projects not yet programed, as of June 30, 1957 71
11. Improvements on the Federal-aid primary system in rural areas financed with Federal-aid funds: Status of projects as of June 30, 1957, and projects completed during the fiscal year 72
12. Improvements on secondary roads in rural areas financed with Federal-aid funds: Status of projects as of June 30, 1957, and projects completed during the fiscal year 74
13. Improvements in urban areas financed with Federal-aid funds: Status of projects as of June 30, 1957, and projects completed during the fiscal year 76
14. Interstate System improvements financed with Federal-aid funds: Status of projects as of June 30, 1957, and projects completed during the fiscal year 78
15. Mileage of designated Federal-aid highway systems, by State, as of December 31, 1956 80
16. Status of National forest highway projects as of June 30, 1957, and projects completed during the fiscal year 82
17. Mileage of the National forest highway system, by forest road class and by State, as of June 30, 1957 84
18. Mileage of highways in National parks, monuments, and parkways constructed by the Bureau of Public Roads during the fiscal year 85
19. Mileage of approach roads to National parks, monuments, and parkways constructed by the Bureau of Public Roads during the fiscal year 85

Table 1.—Summaries of programs approved and work completed in the fiscal year 1957, by class of highway and by fund

	PROGRAMS APPROVED[1]						WORK COMPLETED					
	Total cost	Federal funds	Miles	Railway-highway grade-crossing improvements			Total cost	Federal funds	Miles	Railway-highway grade-crossing improvements		
				Crossings eliminated	Structures reconstructed	Crossings protected				Crossings eliminated	Structures reconstructed	Crossings protected
	By Class of Highway						By Class of Highway					
Primary-rural, Interstate	$1,279,453,499	$1,109,450,314	2, 558. 0	65	5	1	$160, 923, 114	$102, 578, 388	1, 018. 7	35		
Primary-rural, all other	722, 200, 496	379, 490, 395	7, 347. 0	61	13	114	456, 009, 864	237, 319, 493	5, 934. 0	62	8	86
Secondary-rural	507, 007, 039	267, 508, 024	15, 977. 1	29	1	210	389, 731, 549	201, 198, 744	14, 715. 2	35	4	190
Urban-Interstate	1, 139, 268, 540	884, 418, 552	441. 0	90	1		197, 852, 604	107, 260, 270	141. 1	37	1	3
Urban, all other	514, 518, 022	259, 854, 910	1, 012. 6	75	5	40	321, 586, 038	161, 503, 450	1, 035. 0	57	14	63
Subtotal	4, 162, 447, 596	2, 900, 722, 195	27, 335. 7	320	25	365	1, 526, 103, 169	809, 860, 345	22, 844. 0	226	27	342
Not classified[2]	71, 846, 528	64, 178, 184	1, 061. 8		1		63, 458, 050	48, 904, 492	1, 135. 2	4	1	7
Total	4, 234, 294, 124	2. 964, 900, 379	28, 397. 5	320	26	365	1, 589, 561, 219	858, 764, 837	23, 979. 2	230	28	349
	By Fund						By Fund					
Federal-aid:												
Primary	$807, 621, 724	$423, 818, 734	7, 847. 6	76	13	124	$607, 465, 964	$315, 530, 629	6, 913. 5	87	13	116
Secondary	520, 915, 861	274, 162, 042	16, 096. 4	30	1	215	399, 034, 108	205, 790, 689	14, 843. 1	39	4	190
Urban	424, 492, 930	213, 743, 076	452. 6	59	5	25	346, 289, 800	170, 651, 720	350. 9	78	10	35
Interstate	2, 409, 417, 081	1, 988, 998, 343	2, 939. 1	155	6	1	173, 313, 297	117, 887, 307	736. 5	22		1
Subtotal	4, 162, 447, 596	2, 900, 722, 195	27, 335. 7	320	25	365	1, 526, 103, 169	809, 860, 345	22, 844. 0	226	27	342
Access roads, Act of 1950	15, 694, 784	13, 339, 388	172. 2		1		10, 176, 820	8, 104, 182	264. 8	4		7
National forest highway[3]	26, 955, 622	25, 702, 553	431. 1				20, 979, 008	18, 919, 815	497. 3			
National park and parkway[4]	17, 565, 050	17, 565, 050	120. 3				11, 059, 082	11, 059, 082	141. 9			
Public lands	5, 191, 279	4, 367, 011	55. 9				818, 113	776, 040	27. 4			
Emergency flood relief	6, 439, 793	3, 204, 182	282. 3				20, 425, 027	10, 045, 373	203. 8		1	
Subtotal	71, 846, 528	64, 178, 184	1, 061. 8		1		63, 458, 050	48, 904, 492	1, 135. 2	4	1	7
Total	4, 234, 294, 124	2, 964, 900, 379	28, 397. 5	320	26	365	1, 589, 561, 219	858, 764, 837	23, 979. 2	230	28	349

---

[1] Initial commitment of funds.

[2] Access roads, forest, park, public lands, and emergency flood-relief projects.

[3] Includes construction projects only.

[4] Construction supervised by Bureau of Public Roads.

Table 2.—Projects under construction or plans approved on June 30, 1957, by class of highway and by fund

	Total cost	Federal funds	Miles	Railway-highway grade-crossing improvements		
				Crossings eliminated	Structures reconstructed	Crossings protected
BY CLASS OF HIGHWAY						
Primary-rural:						
Interstate	$937, 355, 667	$770, 508, 053	2, 014. 8	78	7	----------
All other	953, 723. 704	497, 031, 221	8, 699. 1	144	22	97
Secondary-rural	546, 630, 540	283, 354. 287	15, 490. 7	32	4	228
Urban:						
Interstate	1, 093, 528, 793	759, 735, 064	395. 9	131	4	----------
All other	832, 059, 412	416, 775, 199	1, 366 3	175	13	47
Subtotal	4, 363, 298, 116	2, 727, 403, 824	27, 966. 8	560	50	372
Not classified [1]	108, 574, 046	89, 102, 269	1, 294. 3	9	1	1
Total	4, 471, 872, 162	2, 816, 506, 093	29, 261. 1	569	51	373
BY FUND						
Federal-aid:						
Primary	$1, 144. 704, 303	$595, 560, 631	9, 548. 4	187	23	112
Secondary	567, 211, 837	293, 236, 869	15, 621. 7	36	4	230
Urban	781, 078. 753	388, 499, 124	613. 0	162	14	30
Interstate	1, 870, 303, 223	1, 450, 107, 200	2, 183. 7	175	9	----------
Subtotal	4, 363, 298. 116	2, 727, 403, 824	27, 966. 8	560	50	372
Prewar Federal-aid grade crossing	682, 282	341, 140	----------	----------	----------	----------
Access roads, Act of 1950	22, 005, 165	19, 140, 930	354. 0	9	1	1
Defense Highway Act	1, 003, 869	501, 931	----------	----------	----------	----------
National forest highway [2]	32, 330, 182	29, 280, 831	529. 0	----------	----------	----------
National park and parkway [3]	25, 261, 432	25, 261, 432	250. 4	----------	----------	----------
Public lands	4, 076, 691	3. 318, 159	37. 3	----------	----------	----------
Emergency flood relief	23, 214, 425	11, 257, 846	123. 6	----------	----------	----------
Subtotal	108, 574, 046	89, 102, 269	1, 294. 3	9	1	1
Total	4, 471, 872, 162	2, 816, 506, 093	29, 261. 1	569	51	373

[1] Prewar Federal-aid grade crossing, access roads (Act of 1950), Defense Highway Act, forest, park, public lands, and emergency flood-relief projects.

[2] Includes construction projects only.

[3] Construction supervised by Bureau of Public Roads.

Table 3.—Projects financed with Federal-aid funds programed [1] during the fiscal year ended June 30, 1957, by State

State or Territory	Primary			Secondary			Urban			Interstate			Total		
	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles
Alabama	$18, 356, 029	$9, 441, 070	231. 3	$15, 617, 870	$7, 826, 597	608. 7	$6, 959, 922	$3, 799, 013	42. 4	$41, 527, 520	$37, 374, 782	126. 5	$82, 461, 341	$58, 441, 462	1, 008. 9
Arizona	7, 416, 318	5, 769, 055	48. 2	6, 934, 711	4, 984, 915	122. 6	1, 238, 339	876, 622	4. 7	32, 298, 383	30, 245, 070	149. 6	47, 887, 751	41, 875, 662	325. 1
Arkansas	13, 373, 506	6, 661, 108	180. 2	9, 226, 677	4, 628. 470	364. 9	4, 411, 255	2, 327, 628	17. 4	35, 381, 750	30, 292, 252	41. 0	62, 393, 188	43, 909, 458	603. 5
California	39, 138, 617	20, 044. 428	92. 9	21, 026, 264	12, 396, 120	237. 8	42, 567, 210	21, 789, 391	35. 3	295, 937, 055	152, 521, 779	102. 8	398, 669, 146	206, 751, 718	468. 8
Colorado	14, 456, 880	8, 061, 923	137. 1	10, 405, 060	4, 987, 274	154. 8	4, 435, 396	2, 400, 726	4. 9	32, 604, 671	29, 015, 467	82. 3	61. 902, 007	44, 465, 390	379. 1
Connecticut	4, 723, 379	2, 298, 747	8. 3	2, 442, 194	1, 151, 927	5. 9	12, 270, 092	5, 688, 468	6. 9	18, 865, 280	15, 342, 756	14. 7	38, 300, 945	24, 481, 898	35. 8
Delaware	3, 315, 037	1, 667, 709	22. 2	3, 915, 000	1, 950, 500	30. 7	235, 000	129, 500	1. 8	5, 617, 183	3, 891, 511	. 1	13, 082, 220	7, 639, 220	54. 8
Florida	13, 715, 794	6, 869, 346	108. 4	6, 464, 420	3, 231, 236	193. 4	2, 214, 529	1, 073, 491	2. 0	36, 052, 897	31, 289, 853	18. 7	58, 447, 640	42, 463, 926	322. 5
Georgia	16, 855, 693	8, 666, 449	173. 7	14, 486, 489	7, 347, 252	382. 7	1, 730, 500	865, 250	. 7	40, 236, 196	33, 641, 963	19. 1	73, 308, 878	50, 520, 914	576. 2
Idaho	5, 902, 472	3, 727, 994	50. 6	4, 855, 052	2, 983, 305	112. 7	664, 039	595, 914	. 6	17, 594, 838	15, 315, 717	35. 9	29, 016, 401	22, 622, 930	199. 8
Illinois	36, 592, 894	19, 165, 691	252. 9	18, 529, 440	9, 264, 501	493. 2	13, 114, 420	7, 139, 590	16. 8	139, 508, 424	123, 488, 213	39. 9	207, 745, 178	159, 057, 995	802. 8
Indiana	12, 866, 485	6, 481, 751	67. 1	11, 951, 522	5, 986, 932	115. 2	5, 713, 871	2, 973, 381	1. 9	18, 854, 048	14, 907, 660	3. 6	49, 385, 926	30, 349, 724	187. 8
Iowa	20, 513, 914	10, 323, 886	496. 8	20, 287, 901	8, 200, 271	837. 6	4, 339, 170	2, 580, 673	16. 5	67, 678, 504	59, 092, 270	157. 6	112, 819, 489	80, 197, 100	1, 508. 5
Kansas	24, 086, 323	12, 022, 665	477. 1	13, 464, 785	6, 754, 297	1, 082. 0	901, 602	457, 387	3. 2	53, 359, 021	48, 020, 585	115. 9	91, 811, 731	67, 254, 934	1. 678. 2
Kentucky	10, 659, 329	5, 449, 265	41. 1	9, 322, 801	4, 754, 498	213. 3	3, 064, 929	2, 195, 944	1. 6	26, 321, 529	21, 836, 736	11. 6	49, 368, 588	34. 236, 443	267. 6
Louisiana	12, 069, 514	5, 453, 657	145. 8	8, 561, 914	4, 280, 957	129. 0	8, 102, 818	4, 051, 409	9. 8	32, 620, 675	27, 786, 009	22. 4	61, 354, 921	41, 572, 032	307. 0
Maine	5, 820, 499	2, 964, 892	50. 9	3, 041, 822	1, 521, 852	38. 5	3, 747, 918	1, 876, 959	5. 9	2, 050, 711	1, 588, 264	1. 2	14, 660, 950	7, 951, 967	96. 5
Maryland	10, 628, 097	5, 314, 050	30. 4	3. 361, 000	1, 681, 103	115. 4	12, 099, 496	6, 522, 990	4. 4	38, 234, 899	33, 025, 276	21. 4	64, 323, 492	46, 543, 419	171. 6
Massachusetts	12, 352, 595	6, 126, 595	16. 6	4, 406, 951	2, 542, 938	9. 8	26, 571, 892	13, 033, 597	8. 1	44, 886, 601	38, 512, 926	13. 9	88, 218, 039	60, 216, 056	48. 4
Michigan	23, 257, 520	11, 529, 682	143. 0	15, 137, 409	7, 568, 632	590. 7	16, 374, 719	6, 565, 935	17. 0	107, 538, 149	95, 361, 898	92. 9	162, 307, 797	121, 026, 147	843. 6
Minnesota	21, 806, 985	11, 336, 387	394. 8	10, 835, 569	5, 495, 180	979. 1	6, 072, 054	3, 083, 021	16. 2	59, 396, 611	52, 637, 246	39. 8	98, 111, 219	72, 551, 834	1, 429. 9
Mississippi	14, 882, 848	7, 594, 175	263. 9	14, 413, 256	7, 010, 485	642. 2	2, 766, 700	1, 386, 850	14. 3	48, 772, 493	42, 652, 079	124. 6	80, 835, 297	58, 643, 589	1, 045. 0
Missouri	29, 603, 091	15, 316, 848	206. 7	15, 267, 763	7, 672, 049	1, 122. 1	15, 459, 220	7, 337, 004	10. 2	59, 576, 362	49, 451. 075	56. 0	119, 906, 436	79, 776, 976	1, 395. 0
Montana	11, 765, 584	7, 313, 319	180. 7	9, 991, 486	6, 479, 497	199. 4	1, 463, 562	957, 437	. 5	15, 915, 264	14, 296, 800	22. 2	39, 135, 896	29, 047, 053	402. 8
Nebraska	19, 603, 833	10, 471, 238	354. 0	15, 739, 569	8, 012, 094	599. 0	1, 157, 894	556, 123	. 7	13, 689, 345	10, 805, 457	13. 0	50, 190, 641	29, 844, 912	966. 7
Nevada	6, 038, 376	4, 974, 474	51. 2	7, 297, 461	6, 082, 332	211. 5	2, 804	2, 340	------	9, 283, 150	8, 726, 533	10. 6	22, 621, 791	19, 785, 679	273. 3
New Hampshire	5, 822, 826	2, 965, 553	27. 0	3, 891, 577	2, 072, 958	24. 6	1, 916, 771	955, 534	4. 5	18, 128, 856	15, 259, 456	18. 3	29, 760, 030	21, 253, 501	74. 4
New Jersey	10, 373, 273	5, 195, 590	14. 0	5, 268, 892	2, 609, 890	27. 4	12, 726, 348	6, 380, 547	4. 9	43, 514, 971	38, 289, 366	11. 9	71, 883, 484	52, 475, 393	58. 2
New Mexico	14, 420, 210	9, 244, 458	117. 8	7, 725, 517	4, 672, 776	188. 7	707, 905	449, 705	3. 0	29, 203, 126	27, 142, 484	105. 0	52, 056, 758	41, 509, 423	414. 5
New York	57, 064, 503	26, 869, 223	293. 8	17, 229, 480	8, 005, 137	95. 9	80, 131, 516	38, 587, 243	68. 1	183, 343, 458	143, 605, 001	44. 9	337, 768, 957	217, 066, 604	502. 7
North Carolina	25, 395, 038	12, 375, 953	242. 6	12, 633, 154	6, 258, 347	277. 8	1, 895, 208	946, 654	7. 9	40, 655, 132	34, 474, 862	227. 1	80, 578, 532	54, 055, 816	755. 4
North Dakota	12, 086, 040	6, 165, 385	415. 1	8, 602, 203	4, 319, 660	1, 049. 7	48, 975	24, 487	1. 4	23, 619, 887	21, 247, 347	108. 8	44, 357, 105	31, 756, 879	1, 575. 0

Ohio	27, 777, 629	13, 920, 721	66. 2	17, 678, 382	9, 543, 587	74. 1	20, 943, 060	11, 392, 360	9. 5	123, 454, 491	110, 178, 843	68. 7	189, 853, 562	145, 035, 511	218. 5
Oklahoma	24, 249, 052	12, 039, 597	204. 4	14, 168, 847	6, 911, 436	530. 6	6, 208, 261	3, 079, 927	16. 2	39, 557, 994	34, 543, 843	90. 8	84, 184, 154	56, 574, 803	842. 0
Oregon	7, 784, 104	4, 769, 225	58. 4	7, 436, 374	4, 486, 063	109. 5	838, 630	515, 988	2. 0	25, 010, 672	23, 038, 817	64. 1	41, 069, 780	32, 810, 093	234. 0
Pennsylvania	36, 398, 276	18, 164, 220	82. 3	17, 376, 307	9, 261, 566	128. 3	50, 990, 504	24, 867, 861	23. 4	151, 156, 958	134, 940, 085	89. 5	255, 922, 045	187, 233, 732	323. 5
Rhode Island	404, 750	202, 375	-------	3, 809, 900	1, 904, 900	10. 8	205, 500	102, 750	------	19, 061, 355	16, 995, 951	8. 1	23, 481, 505	19, 205, 976	18. 9
South Carolina	3, 034, 752	1, 567, 277	31. 3	7, 912, 257	4, 028, 059	540. 5	2, 203, 909	1, 105, 082	4. 8	33, 124, 203	28, 661, 738	87. 6	46, 275, 121	35, 362, 156	664. 2
South Dakota	12, 737, 669	7, 121, 367	306. 4	7, 207, 791	4, 042, 024	470. 2	806, 182	450, 931	1. 7	26, 377, 011	24, 041, 111	56. 0	47, 128, 653	35, 655, 433	834. 3
Tennessee	18, 373, 890	9, 174, 792	122. 5	13, 648, 797	6, 541, 974	546. 0	4, 709, 932	2, 219, 967	4. 3	68, 658, 608	58, 768, 566	13. 9	105, 391, 227	76, 705, 299	686. 7
Texas	56, 205, 869	28, 369, 740	704. 2	28, 682, 696	14, 400, 711	981. 6	17, 061, 660	8, 786, 800	16. 7	96, 132, 363	85, 823, 290	316. 2	198, 082, 588	137, 380, 541	2, 018. 7
Utah	6, 130, 360	4, 582, 401	64. 4	4, 821, 409	3, 136, 621	113. 0	1, 444, 406	1, 077, 241	3. 4	12, 203, 848	11, 554, 217	11. 8	24, 600, 023	20, 350, 480	192. 6
Vermont	3, 435, 377	1, 719, 809	10. 6	2, 517, 789	1, 252, 289	32. 4	8, 171	4, 085	------	13, 561, 463	11, 055, 499	7. 8	19, 522, 800	14, 031, 682	50. 8
Virginia	19, 457, 458	10, 154, 766	150. 7	11, 058, 047	5, 829, 554	181. 5	5, 680, 530	3, 442, 704	9. 1	39, 277, 271	34, 581, 938	20. 0	75, 473, 306	54, 008, 962	361. 3
Washington	9, 027, 248	5, 026, 290	90. 3	7, 591, 716	4, 026, 910	219. 9	1, 876, 614	989, 150	6. 3	30, 149, 414	27, 055, 177	68. 0	48, 644, 992	37, 097, 527	384. 5
West Virginia	5, 743, 313	3, 032, 357	10. 2	10, 437, 568	5, 300, 785	39. 0	590, 877	295, 439	. 3	29, 602, 033	24, 712, 545	32. 8	46, 373, 791	33, 341, 126	82. 3
Wisconsin	18, 436, 644	9, 320, 814	202. 4	14, 998, 713	7, 684, 417	417. 2	10, 312, 673	5, 086, 808	17. 8	23, 604, 858	19, 541, 079	55. 3	67, 352, 888	41, 633, 118	692. 7
Wyoming	7, 820, 068	4, 974, 077	89. 0	5, 784, 682	3, 720, 682	157. 7	666, 817	429, 030	1. 9	28, 806, 432	26, 592, 104	94. 8	43, 077, 999	35, 715, 893	343. 4
Alaska	9, 515, 610	8, 613, 290	304. 9	6, 575, 177	5, 980, 970	262. 8	1, 231	1, 119	------	------------	------------	-------	16, 092, 018	14, 595, 379	567. 7
District of Columbia	2, 970, 037	1, 642, 798	2. 2	1, 254, 335	622, 545	2. 5	3, 298, 352	1, 646, 576	1. 6	17, 411, 118	15, 774, 847	. 4	24, 933, 842	19, 686, 766	6. 7
Hawaii	3, 010, 960	1, 500, 048	11. 0	2, 705, 887	1, 349, 588	7. 7	31, 772	15, 886	------	------------	------------	-------	5, 748, 619	2, 865, 522	18. 7
Puerto Rico	145, 156	60, 204	-------	2, 913, 978	1, 403, 379	14. 8	1, 507, 775	622, 559	------	------------	------------	-------	4, 566, 909	2, 086, 142	14. 8
Total	807, 621, 724	423, 818, 734	7, 847. 6	520, 915, 861	274, 162, 042	16, 096. 4	424, 492, 930	213, 743, 076	452. 6	2,409,417,081	1,988,998,343	2, 939. 1	4,162,447,596	2,900,722,195	27, 335. 7

[1] Initial commitment of funds.

Table 4.—Projects involving Federal funds awarded to contract [1] during the fiscal year ended June 30, 1957, by program and by State

State or Territory	Total cost	Total Federal funds	Federal-aid funds				Other [4]	Miles
			Primary [2]	Secondary	Urban [3]	Interstate		
Alabama	$58, 082, 156	$36, 961, 244	$8, 604, 024	$8, 761, 720	$3, 556, 526	$15, 661, 314	$377, 660	931. 0
Arizona	21, 598, 995	17, 592, 169	4, 729, 397	4, 268, 110	1, 140, 386	7, 454, 276	--------------	174. 4
Arkansas	34, 608, 831	19, 632, 846	6, 325, 593	4, 238, 210	2, 098, 205	6, 970, 838	--------------	528. 7
California	353, 037, 800	179, 629, 934	22, 210, 691	7, 839, 067	17, 235, 858	131, 271, 518	1, 072, 800	373. 1
Colorado	47, 923, 919	32, 924, 870	7, 114, 857	4, 718, 085	1, 443, 987	17, 086, 926	2, 561, 015	419. 7
Connecticut	29, 837, 906	17, 325, 943	2, 109, 607	1, 423, 772	5, 356, 241	8, 004, 098	432, 225	38. 8
Delaware	14, 948, 620	8, 239, 700	2, 625, 909	1, 599, 780	662, 500	3, 351, 511	--------------	64. 8
Florida	50, 776, 531	32, 033, 150	10, 282, 485	2, 783, 890	1, 889, 507	17, 077, 268	--------------	289. 6
Georgia	59, 290, 669	37, 037, 206	8, 202, 774	8, 876, 519	1, 545, 642	18, 228, 029	184, 242	608. 6
Idaho	15, 542, 471	10, 668, 365	2, 834, 800	2, 965, 698	589, 744	4, 278, 123	--------------	211. 6
Illinois	133, 034, 790	97, 261, 914	13, 725, 531	9, 467, 426	5, 413, 734	68, 653, 223	2, 000	812. 6
Indiana	42, 399, 150	26, 321, 754	4, 928, 872	6, 783, 137	2, 936, 095	11, 653, 650	20, 000	193. 3
Iowa	72, 788, 485	46, 714, 238	9, 678, 622	10, 560, 913	3, 914, 467	22, 560, 236	--------------	1, 609. 0
Kansas	56, 217, 041	33, 976, 117	12, 233, 981	7, 394, 525	1, 069, 064	13, 278, 547	--------------	1, 638. 6
Kentucky	43, 402, 129	29, 905, 943	3, 701, 058	5, 385, 067	1, 662, 510	19, 157, 308	--------------	330. 1
Louisiana	32, 625, 849	19, 590, 929	4, 384, 343	2, 271, 864	4, 240, 793	7, 817, 021	876, 908	172. 2
Maine	16, 076, 358	8, 594, 605	2, 942, 657	2, 283, 143	1, 776, 372	1, 457, 733	134, 700	102. 6
Maryland	56, 104, 397	41, 828, 398	3, 711, 130	3, 225, 237	3, 222, 227	31, 667, 804	2, 000	213. 4
Massachusetts	59, 865, 028	39, 207, 609	4, 746, 050	519, 116	12, 129, 715	21, 705, 046	107, 682	33. 7
Michigan	119, 057, 570	79, 044, 208	11, 436, 009	8, 065, 186	9, 742, 931	49, 564, 482	235, 600	800. 7
Minnesota	89, 359, 139	61, 739, 196	11, 460, 437	6, 793, 227	4, 798, 109	38, 687, 423	--------------	1, 657. 0
Mississippi	43, 913, 738	27, 834, 189	6, 208, 481	6, 056, 154	729, 168	14, 840, 386	--------------	768. 1
Missouri	105, 061, 301	70, 339, 143	12, 187, 400	7, 070, 917	5, 996, 713	45, 084, 113	--------------	1, 277. 2
Montana	37, 880, 848	27, 861, 832	8, 664, 962	4, 089, 766	907, 214	14, 199, 890	--------------	334. 5
Nebraska	34, 020, 684	19, 773, 741	7, 926, 574	6, 145, 271	996, 964	4, 384, 157	320, 775	775. 1
Nevada	19, 911, 388	16, 820, 462	8, 058, 189	6, 020, 167	2, 340	2, 739, 766	--------------	310. 6
New Hampshire	17, 927, 406	11, 125, 534	2, 821, 998	2, 194, 631	475, 178	5, 633, 727	--------------	62. 2
New Jersey	57, 019, 632	36, 915, 505	7, 377, 429	994, 032	7, 986, 118	20, 557, 926	--------------	42. 3
New Mexico	51, 690, 449	41, 024, 283	8, 949, 255	4, 128, 445	885, 830	26, 621, 725	439, 028	416. 6
New York	340, 935, 400	212, 633, 700	22, 561, 829	11, 398, 747	42, 025, 473	136, 423, 651	224, 000	442. 7
North Carolina	65, 418, 219	41, 050, 354	10, 970, 857	7, 304, 419	517, 855	22, 063, 923	193, 300	676. 1
North Dakota	34, 766, 332	22, 082, 661	7, 305, 931	4, 908, 151	205, 893	9, 662, 686	--------------	1, 431. 9

Ohio	137, 488, 840	100, 608, 783	12, 925, 755	8, 295, 683	7, 074, 093	71, 812, 729	500, 523	223. 4
Oklahoma	64, 075, 395	38, 846, 842	12, 387, 833	6, 643, 136	1, 852, 760	17, 749, 547	213, 566	757. 4
Oregon	33, 527, 084	25, 876, 917	4, 068, 925	5, 150, 344	812, 488	15, 842, 660	2, 500	239. 9
Pennsylvania	173, 695, 824	120, 273, 137	18, 340, 446	6, 708, 509	13, 482, 264	81, 693, 718	48, 200	245. 4
Rhode Island	22, 211, 795	18, 032, 729	1, 482, 735	638, 649	106, 602	15, 804, 743		14. 9
South Carolina	27, 577, 018	16, 755, 016	4, 961, 989	3, 461, 585	1, 694, 132	6, 637, 310		542. 4
South Dakota	32, 482, 613	21, 051, 312	6, 902, 596	6, 067, 975	3, 136	8, 077, 605		1, 063. 0
Tennessee	66, 245, 305	40, 091, 976	8, 497, 359	6, 639, 724	3, 920, 690	20, 681, 867	352, 336	679. 4
Texas	185, 228, 126	123, 697, 700	30, 385, 740	13, 626, 300	11, 500, 350	67, 883, 110	302, 200	1, 959. 1
Utah	16, 405, 722	13, 094, 638	4, 238, 824	3, 170, 155	802, 603	4, 122, 113	760, 943	230. 5
Vermont	16, 436, 842	11, 686, 298	1, 323, 568	1, 103, 146	4, 085	9, 255, 499		46. 9
Virginia	41, 638, 819	24, 014, 045	7, 481, 949	7, 178, 226	2, 619, 024	6, 541, 846	193, 000	433. 7
Washington	44, 049, 633	30, 610, 827	7, 004, 515	4, 004, 478	1, 935, 787	17, 613, 847	52, 200	370. 0
West Virginia	19, 968, 749	10, 370, 477	5, 318, 101	3, 783, 313	118, 809	1, 150, 254		88. 6
Wisconsin	62, 152, 260	38, 363, 831	9, 409, 282	6, 139, 141	4, 413, 529	18, 401, 879		540. 9
Wyoming	38, 887, 793	31, 347, 089	6, 263, 645	3, 499, 032	2, 234	21, 347, 478	234, 700	411. 9
Alaska	2, 897, 500	2, 645, 299	1, 519, 308	1, 125, 991				221. 8
District of Columbia	20, 722, 303	15, 380, 007	2, 320, 822	175, 558	1, 944, 050	10, 939, 577		5. 0
Hawaii	3, 843, 910	1, 861, 841	929, 016	511, 002	421, 823			11. 7
Puerto Rico	8, 822, 975	4, 061, 547	1, 029, 784	1, 883, 537	1, 138, 226		10, 000	18. 6
Total	3, 233, 481, 740	2, 092, 362, 053	407, 813, 924	260, 339, 876	201, 000, 044	1, 213, 354, 106	9, 854, 103	25, 845. 3

---

[1] Includes preliminary engineering, right-of-way, and force-account projects on which work was started during the fiscal year.

[2] Funds available for either rural or urban portions of the Federal-aid primary highway system.

[3] Funds available for primary system or urban extensions of secondary system.

[4] Includes prewar Federal-aid grade crossing and 1950 access funds.

Table 5.—Status of Federal-aid projects [1] as of June 30, 1957, and projects completed during the fiscal year

State or Territory	Programed,[2] plans not approved			Plans approved, not under construction			Under construction			Completed during fiscal year		
	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles
Alabama	$36,281,512	$28,402,769	255.7	$10,131,213	$5,843,658	108.7	$77,857,521	$48,139,819	955.4	$25,487,034	$13,214,871	610.4
Arizona	24,177,730	21,594,326	180.0	9,958,321	8,502,346	76.3	20,438,924	16,833,716	113.3	12,164,117	9,076,032	165.4
Arkansas	40,277,990	29,259,815	533.4	14,148,740	8,514,007	125.2	33,634,534	19,140,803	464.2	17,114,372	8,815,561	485.8
California	34,295,150	14,142,834	250.5	42,207,698	31,794,721	52.4	404,617,378	203,333,808	289.9	96,825,335	49,647,079	329.9
Colorado	16,679,347	12,280,881	136.6	13,389,591	9,649,197	73.3	40,268,447	27,360,193	278.4	23,453,348	12,438,871	270.7
Connecticut	2,770,584	1,474,419	4.0	26,368,219	15,940,359	18.3	13,358,485	8,868,566	26.5	9,619,468	5,071,192	20.1
Delaware	2,350,000	1,203,000	14.1	3,920,898	2,197,750	28.3	14,331,082	7,955,421	51.9	4,416,991	2,213,363	55.7
Florida	24,640,995	19,406,700	178.2	18,583,511	12,752,016	38.1	38,045,187	21,695,933	235.7	37,581,260	19,744,187	360.5
Georgia	54,712,490	34,015,322	681.6	8,185,503	4,398,699	50.1	89,329,395	50,583,166	834.1	23,995,838	11,957,433	579.8
Idaho	15,691,432	12,419,108	117.3	4,985,763	4,217,907	32.8	16,873,149	11,359,823	199.8	13,024,751	8,295,460	215.9
Illinois	75,227,450	51,418,249	569.9	59,991,377	47,475,454	75.8	150,410,063	102,386,456	883.1	66,718,653	35,079,913	578.7
Indiana	24,501,338	13,294,740	134.0	15,902,448	8,343,956	95.9	44,269,489	28,009,886	168.9	42,445,571	22,925,281	250.6
Iowa	52,024,439	40,277,200	472.9	11,830,190	7,141,593	183.2	67,094,819	43,097,411	1,451.7	31,798,717	17,124,103	989.4
Kansas	48,569,654	39,827,860	897.4	15,156,809	9,448,236	287.8	39,187,711	23,102,810	1,185.0	38,717,432	20,638,242	1,132.1
Kentucky	10,001,980	6,380,970	85.6	4,562,546	2,944,138	11.9	50,670,099	33,646,755	317.0	32,803,496	17,027,646	622.9
Louisiana	41,263,185	26,891,593	173.1	13,909,989	8,827,775	72.9	50,176,424	26,691,361	323.2	17,452,578	9,506,272	188.1
Maine	8,998,839	4,841,984	83.2	2,928,735	1,560,391	16.4	18,965,890	10,085,154	118.6	11,056,878	5,575,168	84.3
Maryland	24,282,107	12,482,523	82.4	16,384,339	11,638,445	18.1	62,350,955	41,302,807	203.8	13,869,836	7,352,891	162.4
Massachusetts	40,602,320	25,549,679	35.0	39,794,279	26,830,081	22.6	64,654,941	35,208,270	55.1	16,458,738	9,007,435	27.4
Michigan	71,513,947	55,534,979	650.2	35,676,020	19,334,477	80.7	112,433,101	75,941,897	473.7	58,081,955	29,268,926	875.4
Minnesota	16,457,728	13,409,714	322.1	15,491,838	11,341,230	87.8	86,795,304	59,390,622	1,424.9	44,394,630	23,014,637	1,743.3
Mississippi	37,607,378	26,728,001	685.7	24,078,100	19,716,158	121.9	40,744,703	23,943,522	814.6	22,438,947	11,293,344	753.4
Missouri	30,956,418	16,172,540	1,161.7	17,267,053	13,682,710	21.6	118,474,786	72,645,516	1,374.1	56,760,744	31,329,950	1,373.4
Montana	10,116,002	6,839,475	192.9	6,210,604	3,697,854	92.6	47,412,489	33,939,868	389.6	21,878,329	13,366,516	516.4
Nebraska	21,988,765	11,908,887	470.9	10,732,327	6,968,465	114.5	36,598,942	20,786,381	1,045.3	32,048,441	17,250,846	778.5
Nevada	5,437,000	4,861,720	39.9	5,132,189	4,722,787	22.9	18,239,655	15,430,222	245.4	11,855,109	9,782,375	276.6
New Hampshire	13,564,947	10,784,938	28.6	1,503,086	1,150,574	1.9	20,577,413	12,376,806	82.9	7,306,319	3,846,638	40.8
New Jersey	10,203,000	5,737,277	70.1	37,493,643	26,767,067	22.3	49,200,419	32,300,357	39.8	25,807,807	12,144,805	43.0
New Mexico	5,293,489	3,776,396	71.7	8,536,483	6,800,187	76.9	33,366,860	27,479,181	180.6	22,678,599	15,013,673	345.9
New York	38,792,728	21,612,991	105.4	61,203,408	33,145,239	114.2	438,132,065	257,205,020	555.1	113,932,648	53,092,907	223.2
North Carolina	33,203,750	21,727,995	325.2	12,102,317	7,961,636	133.9	77,999,258	43,986,939	864.4	39,371,327	20,800,110	554.5
North Dakota	21,278,554	15,751,155	1,230.6	10,746,524	7,382,262	258.6	26,998,496	15,895,370	1,113.5	16,742,421	8,827,280	1,248.6

Ohio	86, 781, 014	56, 943, 474	191. 4	43, 579, 045	31, 081, 887	41. 4	162, 361, 914	105, 985, 904	244. 3	53, 624, 321	30, 233, 571	124. 4
Oklahoma	30, 781, 138	21, 823, 796	409. 0	24, 891, 483	16, 710, 235	139. 2	49, 288, 772	28, 804, 013	521. 2	44, 771, 695	23, 015, 826	607. 0
Oregon	8, 899, 182	7, 206, 600	58. 0	4, 265, 828	3, 516, 457	19. 3	44, 289, 226	31, 922, 408	281. 8	17, 671, 967	10, 960, 039	238. 5
Pennsylvania	118, 151, 547	82, 626, 847	223. 5	62, 567, 303	43, 104, 484	52. 6	202, 563, 337	125, 028, 056	384. 6	65, 980, 976	34, 099, 128	234. 3
Rhode Island	3, 889, 524	2, 057, 262	9. 6	3, 884, 320	3, 495, 888	. 4	33, 207, 660	22, 721, 464	26. 5	5, 265, 035	2, 632, 208	16. 4
South Carolina	38, 904, 799	29, 173, 150	414. 7	2, 704, 153	2, 099, 253	20. 0	37, 801, 586	21, 976, 086	771. 4	10, 855, 919	5, 774, 481	249. 7
South Dakota	31, 310, 724	24, 316, 676	446. 0	4, 798, 590	2, 683, 160	153. 9	27, 087, 811	18, 104, 532	805. 6	24, 423, 421	13, 942, 900	932. 2
Tennessee	65, 262, 529	49, 415, 927	454. 7	6, 967, 332	3, 483, 673	6. 4	82, 878, 111	46, 791, 416	628. 2	27, 689, 938	13, 376, 864	602. 1
Texas	19, 329, 035	13, 124, 951	379. 7	52, 150, 347	38, 065, 520	169. 5	177, 528, 257	113, 182, 190	1, 710. 8	104, 181, 851	54, 688, 680	1, 905. 4
Utah	17, 274, 206	14, 033, 849	143. 3	2, 673, 072	1, 990, 739	13. 8	15, 709, 031	12, 489, 020	191. 2	13, 467, 023	9, 642, 389	163. 6
Vermont	4, 505, 198	3, 057, 100	24. 5	235, 411	115, 225	. 4	20, 122, 493	13, 522, 019	67. 9	8, 035, 919	4, 176, 900	78. 2
Virginia	47, 880, 247	37, 131, 524	174. 0	16, 784, 233	9, 478, 247	136. 8	43, 076, 024	24, 228, 313	306. 3	31, 462, 339	15, 598, 138	480. 5
Washington	22, 350, 829	16, 043, 930	210. 9	4, 796, 347	3, 846, 401	48. 4	50, 576, 986	33, 320, 096	303. 0	23, 339, 442	12, 128, 100	334. 8
West Virginia	43, 774, 006	31, 858, 897	66. 0	4, 018, 349	2, 049, 023	10. 9	31, 375, 263	16, 176, 703	96. 1	9, 100, 910	4, 585, 893	41. 6
Wisconsin	17, 097, 400	9, 417, 400	356. 0	8, 131, 444	4, 213, 321	60. 5	64, 833, 155	38, 328, 545	467. 1	47, 648, 159	24, 803, 461	609. 2
Wyoming	9, 910, 918	8, 170, 218	58. 3	7, 514, 123	5, 969, 105	55. 1	39, 358, 764	30, 581, 662	401. 7	12, 243, 209	8, 082, 827	284. 5
Alaska	11, 098, 921	10, 024, 991	104. 5	2, 812, 597	2, 576, 907	354. 5	2, 135, 500	1, 952, 981	108. 8	45, 000	40, 500	--------
District of Columbia	6, 125, 000	4, 886, 500	2. 9	10, 840, 147	7, 924, 741	4. 6	11, 447, 000	8, 624, 013	. 6	2, 056, 122	979, 266	1. 9
Hawaii	4, 986, 820	2, 493, 410	14. 7	--------	--------	--------	3, 850, 063	1, 830, 478	8. 5	5, 842, 953	2, 890, 168	10. 8
Puerto Rico	4, 137, 703	1, 557, 602	12. 8	--------	--------	--------	18, 171, 294	8, 614, 425	56. 1	10, 095, 281	4, 465, 999	25. 8
Total	1, 486, 212, 988	1, 035, 374, 144	13, 994. 4	842, 127, 885	573, 095, 641	3, 825. 6	3, 521, 170, 231	2, 154, 308, 183	24, 141. 2	1, 526, 103, 169	809, 860, 345	22, 844. 0

---

[1] Includes projects financed from Federal-aid primary, secondary, urban, and interstate funds.
[2] Initial commitment of funds.

Table 6.—Mileage of Federal-aid highway projects completed during fiscal year 1957, by program and by number of lanes

State or Territory	Primary program			Secondary program [1]	Urban program			Interstate program		
	2 lanes	4 lanes	6 lanes or more		2 lanes	4 lanes	6 lanes or more	2 lanes	4 lanes	6 lanes or more
Alabama	82. 5	29. 7		489. 1		3. 0			6. 2	
Arizona	39. 5	5. 4		83. 7		. 9		26. 5	9. 3	
Arkansas	129. 3	. 4		352. 3	1. 2				2. 5	
California	2. 0	59. 2	6. 4	209. 2		10. 1	24. 9		13. 8	4. 2
Colorado	39. 4	33. 8		170. 5	. 3	. 4		7. 3	19. 0	
Connecticut	2. 9	. 8		5. 6		5. 7			5. 2	
Delaware	18. 2	9. 3		28. 2						
Florida	59. 5	126. 6		150. 2		22. 3	1. 3		. 3	. 4
Georgia	125. 6	10. 5		433. 5	. 1	10. 2				
Idaho	119. 7	5. 0		89. 3		2. 0				
Illinois	130. 6	21. 2		386. 7	2. 5	3 1	3. 2		31. 4	
Indiana	99. 0	40. 0		96. 7		8. 8	2. 2		3. 9	
Iowa	262. 6	1. 2		711. 6		14. 0				
Kansas	330. 2	22. 7		714. 4	. 7	7. 2		52. 4	4. 5	
Kentucky	78. 8	20. 2		515. 4	. 6	7. 1	. 8			
Louisiana	88. 3	6. 2	. 3	88. 8		. 2	. 3	4. 1		
Maine	31. 3			49. 2	1. 5	2. 2				
Maryland	2 5	21. 3		130. 2		3 8	3. 2		1. 3	
Massachusetts	3. 5			19. 1		2. 7	2. 1			
Michigan	144. 4	81. 5	6. 6	595. 1	2. 4	2. 9	18. 5	1. 8	22. 2	. 1
Minnesota	364 0	32. 4		1, 272. 7	1. 3	15. 8	1. 5	42. 9	12. 7	
Mississippi	233. 0	3. 2		485. 4	1. 2	2. 1	1. 3	20. 3	6. 9	
Missouri	54. 6	14. 4		1, 279. 9		1. 7	. 2		22. 5	
Montana	297. 3	1. 6		203. 9				13. 6		
Nebraska	344. 9	. 8		431. 3	1. 1	. 4				
Nevada	115. 2	4. 2		156. 9		. 3				
New Hampshire	19. 6	1. 4		18. 5	1. 3					
New Jersey	5 2	14. 8	4. 0	10. 0		5. 3	3. 8			
New Mexico	64. 9	34. 2		229. 7	. 1	5. 2			11. 8	
New York	96. 1	41. 7		42. 9	5. 4	18. 0	17. 7			1. 3
North Carolina	128. 5	50. 9		337. 0		3. 2		22. 2	12. 6	
North Dakota	308. 6	1. 4		926. 5				12 1		

Ohio	6.3	18.5		85.2	.2	7.1	.5		6.6	
Oklahoma	196.7	43.0		344.7	3.9	8.8	.6		3.3	5.9
Oregon	49.4	7.9		144.7		1.5		30.4	4.6	
Pennsylvania	68.4	35.7	3.0	113.1	2.9	4.2	.9		6.2	
Rhode Island		2.4		11.6		2.5				
South Carolina	31.4	18.7		188.0		1.4			10.2	
South Dakota	420.9	6.3		432.7		4.4		67.6	.4	
Tennessee	87.6	31.9		478.3	.1	4.1				
Texas	439.3	186.0	11.2	1,083.6	5.5	9.1	4.6	4.2	159.3	2.4
Utah	54.1	11.9		80.6		1.8	2.4	6.6	6.2	
Vermont	35.7			42.5						
Virginia	101.0	37.8	.8	324.6	1.6	2.2			12.6	
Washington	151.1	1.5		178.8		3.0	.2		.1	
West Virginia	30.0	3.6		8.0						
Wisconsin	168.9	17.1		409.2	6.5	6.2			1.3	
Wyoming	89.4	2.5		177.3		2.0		13.3		
Hawaii		.1		10.7						
District of Columbia		.6					1.3			
Puerto Rico	7.8			16.0		2.1				
Total	5,759.7	1,121.5	32.3	14,843.1	40.4	219.0	91.5	325.3	396.9	14.3

[1] Total mileage completed, principally two-lane construction.

Table 7.—Lane classification of mileage of Federal-aid highway projects completed during fiscal year 1957, by class of fund

Number of lanes	Mileage					Total lane miles
	Primary	Secondary	Urban	Interstate	Total	
2-lane	5,759.7	[1] 14,843.1	40.4	325.3	20,968.5	41,937.0
4-lane	1,121.5		219.0	396.9	1,737.4	6,949.6
6 lanes and over	32.3		91.5	14.3	138.1	828.6
Total	6,913.5	14,843.1	350.9	736.5	22,844.0	[2] 49,715.2

[1] Total mileage completed, principally 2-lane construction.
[2] 6-lane-and-over mileage was all converted to lane miles on the basis of 6 lanes.

Table 8.—Apportionment of Federal-aid highway funds authorized for the fiscal year ending June 30, 1958, under the Federal-Aid Highway Act of 1956

State or Territory	Primary highway system ($382,500,000)	Secondary or feeder roads ($255,000,000)	Urban highways ($212,500,000)	Subtotal ($850,000,000)	Interstate System ($1,700,000,000)	Total ($2,550,000,000)
Alabama	$7, 999, 657	$6, 231, 516	$2, 800, 282	$17, 031, 455	$34, 535, 199	$51, 566, 654
Arizona	5, 564, 327	3, 793, 041	831, 380	10, 188, 748	19, 482, 364	29, 671, 112
Arkansas	6, 351, 175	5, 100, 247	1, 195, 698	12, 647, 120	24, 701, 304	37, 348, 424
California	17, 656, 495	9, 051, 859	19, 000, 084	45, 708, 438	96, 947, 850	142, 656, 288
Colorado	6, 962, 848	4, 650, 118	1, 776, 420	13, 389, 386	23, 236, 806	36, 626, 192
Connecticut	2, 511, 026	1, 275, 000	4, 139, 538	7, 925, 564	16, 369, 117	24, 294, 681
Delaware	1, 912, 500	1, 275, 000	438, 356	3, 625, 856	10, 625, 000	14, 250, 856
Florida	6, 155, 888	4, 020, 693	3, 832, 693	14, 009, 274	28, 903, 333	42, 912, 607
Georgia	9, 339, 362	7, 160, 423	3, 115, 011	19, 614, 796	39, 616, 416	59, 231, 212
Idaho	4, 626, 563	3, 260, 481	411, 359	8, 298, 403	17, 208, 331	25, 506, 734
Illinois	14, 885, 768	8, 087, 214	14, 947, 982	37, 920, 964	80, 153, 014	118, 073, 978
Indiana	9, 004, 034	6, 210, 115	5, 113, 538	20, 327, 687	41, 355, 363	61, 683, 050
Iowa	9, 126, 938	6, 696, 311	2, 537, 527	18, 360, 776	34, 724, 683	53, 085, 459
Kansas	9, 039, 116	6, 341, 707	2, 008, 948	17, 389, 771	30, 851, 048	48, 240, 819
Kentucky	7, 121, 201	5, 920, 108	2, 219, 670	15, 260, 979	31, 883, 256	47, 144, 235
Louisiana	6, 014, 098	4, 354, 764	3, 133, 203	13, 502, 065	28, 059, 713	41, 561, 778
Maine	3, 168, 163	2, 271, 676	893, 309	6, 333, 148	13, 671, 647	20, 004, 795
Maryland	3, 193, 052	2, 137, 600	3, 627, 586	9, 258, 238	20, 389, 657	29, 647, 895
Massachusetts	5, 001, 079	1, 870, 588	8, 896, 443	15, 768, 110	36, 294, 838	52, 062, 948
Michigan	11, 961, 420	7, 288, 433	9, 948, 069	29, 197, 922	61, 118, 779	90, 316, 701
Minnesota	9, 791, 777	6, 923, 260	3, 480, 546	20, 195, 583	38, 301, 280	58, 496, 863
Mississippi	6, 731, 116	5, 644, 662	1, 183, 389	13, 559, 167	26, 959, 412	40, 518, 579
Missouri	10. 969, 550	7, 424, 071	5, 263, 909	23, 657, 530	46, 047, 041	69, 704, 571
Montana	7, 690, 914	5, 293, 005	503, 309	13, 487, 228	24, 418, 868	37, 906, 096
Nebraska	7, 543, 121	5, 349, 865	1, 253, 609	14, 146, 595	24, 380, 498	38, 527, 093
Nevada	4, 804, 877	3, 211, 672	162, 785	8, 179, 334	17, 748, 097	25, 927, 431
New Hampshire	1, 912, 500	1, 275, 000	632, 994	3, 820, 494	10, 625, 000	14, 445, 494
New Jersey	5, 076, 800	1, 719, 295	9, 356, 635	16, 152, 730	37, 235, 749	53, 388, 479
New Mexico	6, 063, 490	4, 170, 829	701, 472	10, 935, 791	20, 639, 872	31, 575, 663
New York	18, 332, 194	7, 344, 788	28, 569, 598	54, 246, 580	120, 519, 432	174, 766, 012
North Carolina	9, 543, 932	8, 170, 860	2, 746, 606	20, 461, 398	43, 338, 366	63, 799, 764
North Dakota	5, 392, 131	3, 930, 549	361, 421	9, 684, 101	18, 845, 697	28, 529, 798

Ohio	13, 461, 694	8, 177, 775	12, 368, 905	34, 008, 374	72, 792, 020	106, 800, 394
Oklahoma	8, 091, 231	5, 804, 793	2, 335, 198	16, 231, 222	30, 416, 292	46, 647, 514
Oregon	6, 441, 151	4, 507, 969	1, 713, 893	12, 663, 013	23, 078, 783	35, 741, 796
Pennsylvania	15, 556, 350	9, 271, 120	16, 181, 288	41, 008, 758	91, 134, 502	132, 143, 260
Rhode Island	1, 912, 500	1, 275, 000	1, 527, 972	4, 715, 472	10, 625, 000	15, 340, 472
South Carolina	5, 086, 564	4, 236, 227	1, 470, 316	10, 793. 107	22, 859, 030	33, 652, 137
South Dakota	5, 751, 580	4, 123, 547	415, 150	10, 290, 277	19, 686, 343	29, 976, 620
Tennessee	8, 286, 010	6, 473, 980	3, 090, 834	17, 850, 824	36, 350, 645	54, 201, 469
Texas	24, 595, 201	16, 467, 269	10, 239, 705	51, 302, 175	97, 702, 705	149, 004, 880
Utah	4, 333, 223	2, 865, 592	905, 691	8, 104, 506	16, 563, 897	24, 668, 403
Vermont	1, 912, 500	1, 275, 000	332, 809	3, 520, 309	10, 625, 000	14, 145, 309
Virginia	7, 358, 278	5, 721, 652	3, 333, 081	16, 413, 011	34, 413, 985	50, 826, 996
Washington	6, 353, 904	4, 243, 624	3, 225, 116	13, 822, 644	27, 303, 532	41, 126, 176
West Virginia	4, 204, 038	3, 667, 813	1, 391, 070	9, 262, 921	20, 252, 080	29, 515, 001
Wisconsin	8, 968, 694	6, 263, 258	4, 185, 524	19, 417, 476	38, 719, 243	58, 136, 719
Wyoming	4, 798, 233	3, 252, 215	232, 404	8, 282, 852	17, 664, 913	25, 947, 765
Alaska	7, 809, 925	5, 266, 562	65, 112	13, 141, 599	---------	13, 141, 599
District of Columbia	1, 912, 500	1, 275, 000	1, 846, 546	5, 034, 046	10, 625, 000	15, 659, 046
Hawaii	1, 912, 500	1, 275, 000	718, 750	3, 906, 250	---------	3, 906, 250
Puerto Rico	2, 006, 812	2, 101, 854	1, 837, 267	5, 945, 933	---------	5, 945, 933

Table 9.—Federal highway funds paid by Bureau of Public Roads during fiscal year ended June 30, 1957, by program and by State

State or Territory	Federal-aid funds				Defense Highway funds	Total [2]
	Primary [1]	Secondary	Urban	Interstate		
Alabama	$8, 448, 179	$7, 870, 771	$2, 456, 285	$1, 852, 664	$249, 361	$20, 877, 260
Arizona	4, 077, 875	4, 075, 095	733, 521	2, 096, 811	673, 473	11, 656, 775
Arkansas	4, 204, 322	4, 048, 805	539, 521	1, 542, 606	------------	10, 335, 254
California	15, 853, 357	7, 836, 672	17, 877, 317	59, 325, 188	812, 312	101, 704, 846
Colorado	6, 087, 125	4, 045, 125	1, 403, 607	4, 667, 647	1, 923, 705	18, 127, 209
Connecticut	956, 408	933, 320	633, 701	545, 439	280, 450	3, 349, 318
Delaware	2, 373, 755	1, 437, 895	294, 996	3, 192	------------	4, 109, 838
Florida	8, 560, 271	2, 519, 128	6, 029, 690	816, 491	95, 625	18, 021, 205
Georgia	6, 026, 773	6, 003, 043	2, 165, 767	1, 122, 215	156, 604	15, 602, 106
Idaho	4, 843, 918	2, 401, 126	218, 465	1, 094, 892	336, 509	8, 894, 910
Illinois	13, 847, 456	6, 786, 829	9, 505, 759	7, 253, 311	------------	37, 393, 355
Indiana	6, 107, 410	5, 365, 033	2, 006, 850	2, 010, 583	114, 252	15, 604, 128
Iowa	8, 802, 504	6, 321, 950	3, 410, 396	1, 494, 221	------------	20, 029, 071
Kansas	9, 674, 385	5, 846, 941	1, 862, 047	4, 309, 305	−5, 179	21, 687, 499
Kentucky	3, 384, 379	6, 964, 457	610, 928	1, 661, 680	86, 503	12, 707, 947
Louisiana	4, 406, 252	3, 833, 452	1, 426, 335	108, 337	916, 305	10, 690, 681
Maine	3, 435, 286	2, 317, 753	425, 477	1, 101, 122	303, 635	7, 583, 273
Maryland	2, 445, 741	1, 362, 703	2, 395, 710	7, 041, 336	2, 855	13, 248, 345
Massachusetts	2, 397, 871	995, 437	4, 572, 516	2, 210, 830	------------	10, 218, 852
Michigan	12, 704, 164	7, 272, 058	7, 253, 413	8, 953, 211	63, 618	36, 246, 464
Minnesota	9, 847, 110	6, 520, 639	3, 893, 619	3, 625, 839	------------	23, 887, 207
Mississippi	6, 548, 074	5, 244, 675	814, 741	2, 689, 674	52, 140	15, 349, 304
Missouri	6, 832, 342	6, 520, 276	7, 806, 993	7, 357, 063	20, 487	28, 537, 161
Montana	10, 068, 058	6, 120, 482	560, 556	558, 174	9, 895	17, 317, 165
Nebraska	8, 568, 615	5, 430, 263	1, 020, 632	105, 602	271, 500	15, 396, 612
Nevada	6, 010, 944	3, 483, 609	171, 996	817, 762	------------	10, 484, 311
New Hampshire	1, 052, 758	1, 399, 317	136, 499	161	------------	2, 588, 735
New Jersey	3, 508, 345	1, 000, 060	4, 379, 087	676, 850	------------	9, 564, 342
New Mexico	6, 616, 068	5, 182, 103	696, 744	7, 503, 124	226, 127	20, 224, 166
New York	15, 470, 182	4, 600, 543	20, 490, 391	7, 810, 913	124, 055	48, 496, 084
North Carolina	9, 389, 811	8, 999, 870	3, 369, 025	2, 502, 244	506, 654	24, 767, 604
North Dakota	4, 737, 329	4, 737, 837	45, 008	1, 597, 746	------------	11, 117, 920
Ohio	8, 271, 416	5, 962, 201	12, 701, 120	16, 983, 109	1, 022, 941	44, 940, 817
Oklahoma	9, 203, 781	4, 427, 107	2, 077, 463	2, 554, 682	223, 811	18, 486, 844
Oregon	7, 151, 587	4, 239, 231	2, 223, 716	4, 648, 367	23, 860	18, 286, 761
Pennsylvania	11, 641, 260	5, 494, 702	8, 645, 245	7, 091, 574	1, 407	32, 874, 188
Rhode Island	2, 089, 742	819, 389	1, 694, 126	1, 048, 460	------------	5, 651, 717
South Carolina	4, 814, 468	2, 239, 356	984, 264	773, 577	------------	8, 811, 665
South Dakota	6, 458, 815	4, 176, 867	128, 260	1, 822, 948	1, 092	12, 587, 982
Tennessee	8, 661, 720	5, 154, 267	1, 102, 769	621, 546	3, 136	15, 543, 438
Texas	28, 424, 510	15, 896, 900	10, 812, 900	19, 880, 500	80, 530	75, 095, 340
Utah	2, 877, 309	2, 561, 056	1, 021, 505	1, 996, 586	846, 272	9, 302, 728
Vermont	1, 855, 872	1, 145, 439	573, 117	321, 967	------------	3, 896, 395
Virginia	7, 634, 547	6, 740, 719	1, 378, 483	2, 036, 826	724, 090	18, 514, 665
Washington	6, 325, 659	3, 605, 589	1, 268, 689	1, 936, 764	53, 008	13, 208, 818
West Virginia	2, 862, 042	1, 443, 781	690, 595	41, 507	193, 960	5, 231, 885
Wisconsin	9, 986, 075	4, 904, 574	4, 489, 229	1, 191, 540	4, 097	20, 575, 515
Wyoming	5, 514, 140	3, 164, 526	111, 028	3, 146, 055	196, 465	12, 132, 214
Alaska	92	2, 632	------------	------------	809	3, 533
District of Columbia	490, 647	419, 753	715, 351	324, 327	------------	1, 950, 078
Hawaii	1, 097, 777	1, 318, 017	493, 930	------------	------------	2, 909, 724
Puerto Rico	2, 243, 141	2, 014, 356	1, 554, 734	------------	4, 429	5, 816, 660
Undistributed	------------	------------	------------	------------	−372, 978	−372, 978
Total	344, 891, 697	223, 207, 729	161, 874, 116	210, 876, 568	10, 227, 815	951, 266, 936

[1] Funds available for either urban or rural portions of the Federal-aid primary highway system.

[2] Included in the totals are the following payments of prewar Federal-aid grade-crossing funds:

Georgia	$127, 704	Washington	$19, 109
Massachusetts	42, 198		
		Total	189, 011

Table 10.—Balances of Federal-aid funds available to States for projects not yet programed, as of June 30, 1957

State or Territory	Primary [1]	Secondary	Urban	Subtotal	Interstate	Total
Alabama	$345, 353	$127, 113	$595, 169	$1, 067, 635	$17, 367, 745	$18, 435, 380
Arizona	171, 240	239, 650	80, 877	491, 767	904, 687	1, 396, 454
Arkansas	2, 315, 211	1, 906, 194	694, 428	4, 915, 833	12, 950, 180	17, 866, 013
California	265, 162	550, 789	397, 502	1, 213, 453	1, 454, 217	2, 667, 670
Colorado	5, 035, 060	3, 503, 116	1, 342, 492	9, 880, 668	9, 825, 663	19, 706, 331
Connecticut	5, 026, 089	2, 051, 202	12, 451, 100	19, 528, 391	13, 562, 395	33, 090, 786
Delaware	592, 979	360, 760	458, 727	1, 412, 466	15, 239, 370	16, 651, 836
Florida	168, 679	4, 094, 857	3, 382, 476	7, 646, 012	17, 099, 407	24, 745, 419
Georgia	1, 828, 938	205, 866	4, 632, 033	6, 666, 837	34, 885, 044	41, 551, 881
Idaho	3, 259, 365	1, 777, 121	227, 762	5, 264, 248	14, 742, 569	20, 006, 817
Illinois	2, 852, 098	3, 730, 671	15, 655, 612	22, 238, 381	4, 139, 318	26, 377, 699
Indiana	12, 252, 778	7, 337, 010	8, 763, 556	28, 353, 344	55, 653, 368	84, 006, 712
Iowa	346, 658	537, 624	409, 878	1, 294, 160	2, 288, 176	3, 582, 336
Kansas	570, 277	2, 465, 392	1, 712, 016	4, 747, 685	985, 826	5, 733, 511
Kentucky	7, 692, 464	2, 941, 387	3, 523, 656	14, 157, 507	32, 428, 119	46, 585, 626
Louisiana	2, 390, 500	453, 932	3, 276, 433	6, 120, 865	19, 994, 042	26, 114, 907
Maine	1, 227, 792	1, 108, 967	768, 709	3, 105, 468	20, 712, 528	23, 817, 996
Maryland	378, 376	1, 429, 838	1, 320, 465	3, 128, 679	305, 844	3, 434, 523
Massachusetts	2, 974, 102	1, 358, 970	1, 137, 394	5, 470, 466	21, 177, 807	26, 648, 273
Michigan	3, 315, 581	2, 328, 920	9, 225, 955	14, 870, 456	2, 947, 180	17, 817, 636
Minnesota	112, 143	4, 271, 639	809, 149	5, 192, 931	10, 492, 716	15, 685, 647
Mississippi	2, 839, 950	450, 974	1, 112, 237	4, 403, 161	1, 992, 859	6, 396, 020
Missouri	158, 666	3, 027, 521	269, 067	3, 455, 254	23, 674, 706	27, 129, 960
Montana	1, 772, 520	4, 745, 667	211, 691	6, 729, 878	28, 621, 597	35, 351, 475
Nebraska	231, 877	823, 203	2, 480, 507	3, 535, 587	33, 251, 995	36, 787, 582
Nevada	1, 477, 329	1, 047, 572	162, 785	2, 687, 686	21, 437, 953	24, 125, 639
New Hampshire	456, 792	586, 633	487, 209	1, 530, 634	3, 735, 218	5, 265, 852
New Jersey	3, 563, 008	971, 304	11, 391, 168	15, 925, 480	27, 573, 724	43, 499, 204
New Mexico	493, 342	888, 728	985, 755	2, 367, 825	5, 579, 093	7, 946, 918
New York	244, 592	5, 148, 327	12, 235, 658	17, 628, 577	50, 380, 470	68, 009, 047
North Carolina	287, 388	2, 607, 946	2, 460, 903	5, 356, 237	38, 811, 982	44, 168, 219
North Dakota	790, 729	284, 829	937, 063	2, 012, 621	11, 441, 176	13, 453, 797
Ohio	1, 004, 033	3, 918, 832	13, 602, 241	18, 525, 106	5, 432, 012	23, 957, 118
Oklahoma	1, 553, 237	3, 559, 302	1, 031, 003	6, 143, 542	15, 797, 743	21, 941, 285
Oregon	1, 107, 775	1, 455, 505	1, 817, 595	4, 380, 875	13, 622, 009	18, 002, 884
Pennsylvania	1, 449, 690	1, 842, 422	4, 237, 086	7, 529, 198	11, 062, 460	18, 591, 658
Rhode Island	2, 309, 287	113, 933	1, 724, 766	4, 147, 986	195, 786	4, 343, 772
South Carolina	3, 582, 377	3, 485, 393	296, 913	7, 364, 683	10, 991, 326	18, 356, 009
South Dakota	406, 021	850, 270	77, 376	1, 333, 667	7, 298, 653	8, 632, 320
Tennessee	526, 596	3, 480, 193	3, 247, 105	7, 253, 894	6, 122, 628	13, 376, 522
Texas	702, 691	11, 762, 564	3, 732, 176	16, 197, 431	70, 184, 851	86, 382, 282
Utah	221, 055	89, 116	1	310, 172	14, 821, 355	15, 131, 527
Vermont	1, 845, 063	331, 835	396, 463	2, 573, 361	8, 053, 516	10, 626, 877
Virginia	26, 438	415, 981	2, 588, 444	3, 030, 863	22, 696, 488	25, 727, 351
Washington	2, 798, 247	403, 870	4, 055, 430	7, 257, 547	17, 255, 633	24, 513, 180
West Virginia	1, 323, 370	4, 937, 647	955, 146	7, 216, 163	11, 311, 094	18, 527, 257
Wisconsin	1, 690, 557	1, 763, 076	1, 866, 491	5, 320, 124	47, 124, 098	52, 444, 222
Wyoming	261, 828	50, 384	150, 533	462, 745	1, 626, 230	2, 088, 975
Alaska	345, 153	60, 087	73, 568	478, 808	------------	478, 808
District of Columbia	4, 311, 669	2, 871, 820	4, 387, 518	11, 571, 007	3, 219, 827	14, 790, 834
Hawaii	2, 239, 180	1, 345, 781	1, 531, 345	5, 116, 306	------------	5, 116, 306
Puerto Rico	3, 538, 140	3, 761, 401	4, 236, 113	11, 535, 654	------------	11, 535, 654
Total	96, 679, 445	109, 863, 134	153, 606, 745	360, 149, 324	822, 472, 683	1, 182, 622, 007

---

[1] Funds available for either urban or rural portions of the Federal-aid primary highway system.

Table 11.—Improvements on the Federal-aid primary system in rural areas financed with Federal-aid funds:[1] Status of projects as of June 30, 1957, and projects completed during the fiscal year

State or Territory	Programed,[2] plans not approved			Plans approved, not under construction			Under construction			Completed during fiscal year		
	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles
Alabama	$25, 149, 548	$21, 492, 545	129. 7	$8, 007, 937	$4, 574, 534	98. 7	$45, 828, 430	$30, 531, 532	262. 3	$10, 376, 900	$5, 585, 012	101. 8
Arizona	20, 329, 676	18, 825, 582	108. 5	7, 303, 572	6, 600, 939	45. 7	12, 035, 122	10, 167, 321	54. 8	6, 263, 711	4, 736, 794	76. 4
Arkansas	13, 404, 653	8, 891, 046	110. 0	9, 167, 490	6, 023, 382	93. 6	18, 199, 998	10, 761, 200	128. 4	8, 250, 558	4, 339, 655	122. 1
California	8, 820, 780	1, 300	7. 3	12, 369, 428	11, 338, 000	32. 4	99, 225, 099	68, 741, 973	162 6	32, 143, 184	16, 047, 499	71. 0
Colorado	7, 136, 464	5, 391, 391	47. 2	9, 671, 239	7, 285, 687	53. 3	20, 492, 062	14, 523, 594	138. 6	11, 022, 619	6, 245, 211	97. 2
Connecticut	348, 148	283, 201	----------	9, 898, 953	6, 899, 835	8. 8	2, 483, 953	1, 648, 582	2. 7	2, 850, 905	1, 575, 186	8. 9
Delaware	----------	----------	----------	2, 232, 978	1, 359, 720	7. 8	10, 400, 482	6, 023, 230	29. 5	2, 411, 903	1, 199, 906	27. 4
Florida	7, 121, 995	5, 820, 800	31. 0	3, 688, 253	1, 851, 380	26. 3	19, 824, 399	10, 926, 585	117. 5	13, 624, 850	6, 844, 455	144. 5
Georgia	27, 754, 716	16, 276, 028	297. 5	5, 295, 995	2, 631, 690	49. 1	34, 387, 118	20, 428, 869	198. 6	8, 054, 777	3, 879, 898	135. 3
Idaho	11, 773, 639	9, 694, 051	26. 2	4, 361, 972	3, 615, 736	32. 5	10, 625, 490	7, 410, 277	91. 6	7, 288, 909	4, 480, 653	123. 6
Illinois	28, 961, 852	21, 374, 723	66. 3	11, 146, 608	6, 883, 467	55. 5	51, 843, 232	32, 696, 087	247. 4	31, 476, 340	17, 576, 567	166. 4
Indiana	11, 811, 117	6, 172, 979	65. 2	6, 617, 742	3, 318, 678	25. 3	24, 206, 126	16, 487, 343	77. 3	13, 968, 631	7, 178, 935	115. 4
Iowa	36, 698, 910	32, 681, 219	111. 0	7, 807, 175	4, 024, 563	162. 0	36, 362, 469	26, 211, 337	363 9	15, 712, 814	8, 740, 496	256. 5
Kansas	32, 841, 545	28, 724, 605	120. 7	12, 096, 715	6, 757, 268	274. 1	13, 144, 696	7, 856, 680	192 8	18, 943, 065	10, 459, 816	361. 0
Kentucky	7, 378, 250	5, 051, 025	27. 7	1, 113, 028	562, 952	7. 8	20, 948, 368	14, 798, 532	26. 7	6, 913, 819	3, 494, 166	75. 9
Louisiana	17, 903, 284	12, 706, 162	66. 7	10, 938, 469	6, 775, 095	72. 3	20, 471, 820	12, 125, 564	106. 8	5, 440, 463	2, 735, 290	70. 2
Maine	5, 847, 429	3, 263, 279	31. 5	667, 155	347, 021	15. 6	11, 302, 166	6, 103, 214	61. 2	4, 545, 305	2, 402, 590	31. 3
Maryland	6, 657, 672	3, 178, 303	20. 6	10, 083, 999	7, 277, 630	16. 7	17, 437, 541	11, 879, 422	43. 2	2, 104, 903	979, 881	21. 3
Massachusetts	22, 780, 153	16, 298, 594	17. 4	6, 519, 405	4, 300, 827	11. 4	13, 778, 204	7, 344, 148	21. 8	1, 585, 382	1, 008, 632	3. 5
Michigan	25, 573, 900	21, 819, 104	57. 9	14, 302, 895	9, 214, 534	69. 1	76, 746, 565	56, 278, 037	169. 8	16, 104, 121	8, 296, 564	187. 7
Minnesota	7, 887, 300	7, 282, 300	7. 7	7, 051, 822	4, 825, 898	71. 6	30, 233, 725	19, 962, 385	377. 9	19, 585, 795	10, 265, 119	356. 4
Mississippi	16, 915, 192	12, 618, 990	176. 3	16, 174, 100	12, 929, 598	107. 8	18, 591, 118	11, 488, 292	221. 8	10, 286, 972	5, 556, 352	249. 2
Missouri	13, 120, 506	7, 208, 254	93. 0	2, 402, 772	2, 084, 103	5. 1	47, 966, 950	31, 462, 915	179. 0	18, 527, 877	10, 529, 868	84. 5
Montana	2, 746, 971	2, 001, 747	52. 2	5, 398, 083	3, 237, 723	88. 8	23, 993, 378	17, 471, 917	178. 8	13, 796, 014	8, 728, 443	305. 2
Nebraska	9, 553, 421	5, 595, 915	83. 0	9, 613, 365	6, 433, 553	113. 7	18, 845, 381	11, 653, 830	267. 4	16, 671, 878	8, 732, 465	328. 6
Nevada	3, 940, 000	3, 610, 081	18. 7	5, 132, 189	4, 722, 787	22. 9	9, 729, 008	8, 371, 782	36. 0	6, 099, 909	5, 019, 744	118. 9
New Hampshire	6, 579, 997	5, 332, 000	14. 4	199, 061	135, 388	. 5	14, 233, 075	8, 602, 426	53 6	3, 188, 081	1, 561, 226	19. 7
New Jersey	1, 030, 000	751, 000	2. 6	26, 516, 814	20, 233, 180	16. 3	14, 649, 841	10, 707, 234	12. 3	4, 761, 147	2, 378, 676	8. 1
New Mexico	2, 631, 604	2, 090, 137	19. 0	7, 522, 019	6, 139, 267	42. 0	26, 765, 668	23, 521, 339	120. 1	12, 825, 330	8, 682, 300	104. 3
New York	17, 898, 921	10, 226, 088	60. 0	31, 902, 561	18, 657, 244	89. 7	123, 832, 552	81, 175, 643	291. 0	29, 320, 882	13, 671, 838	131. 8
North Carolina	23, 345, 870	16, 593, 370	157. 3	9, 462, 706	5, 957, 205	118. 8	52, 189, 055	31, 685, 562	500. 7	24, 123, 580	13, 406, 786	262. 7
North Dakota	15, 107, 133	12, 656, 569	105. 8	10, 015, 824	6, 960, 187	236. 4	14, 816, 184	9, 162, 027	341. 0	8, 896, 955	4, 739, 371	305. 0

Ohio	41, 610, 886	28, 701, 997	86. 1	19, 147, 740	13, 232, 739	33. 4	81, 723, 798	53, 780, 371	122. 1	12, 939, 193	7, 838, 457	28. 2
Oklahoma	18, 678, 965	15, 250, 880	63. 1	21, 592, 101	15, 057, 389	131. 0	25, 032, 841	15, 749, 892	127. 9	24, 354, 697	12, 422, 163	227. 0
Oregon	6, 038, 353	5, 165, 800	15. 6	2, 768, 887	2, 205, 357	14. 1	25, 867, 326	20, 371, 342	138. 6	10, 237, 998	6, 563, 795	91. 5
Pennsylvania	49, 283, 996	36, 696, 562	93. 1	24, 407, 686	17, 704, 843	45. 6	71, 889, 370	44, 885, 731	147. 5	20, 023, 023	11, 532, 024	93. 9
Rhode Island	281, 250	253, 125		670, 410	603, 369	. 1	9, 193, 571	8, 000, 756	5. 4	79, 498	39, 749	
South Carolina	29, 510, 999	23, 929, 100	126. 0	2, 598, 153	1, 993, 253	20. 0	21, 969, 235	13, 358, 212	104. 2	6, 510, 086	3, 548, 640	57. 2
South Dakota	19, 669, 367	16, 168, 038	80. 8	4, 575, 234	2, 558, 305	152. 7	16, 643, 062	11, 708, 243	283. 6	15, 303, 495	8, 775, 588	495. 2
Tennessee	20, 546, 901	16, 597, 512	35. 5	874, 156	437, 083	2. 6	39, 491, 517	22, 490, 004	163. 1	9, 468, 350	4, 648, 102	92. 3
Texas	517, 000	466, 300	7. 1	24, 028, 517	17, 260, 980	134. 4	87, 819, 577	60, 175, 390	735. 9	52, 470, 426	29, 085, 880	660. 9
Utah	11, 904, 002	10, 489, 039	52. 0	1, 617, 647	1, 206, 806	10. 8	9, 087, 516	7, 435, 936	38. 3	8, 819, 876	6, 385, 843	78. 8
Vermont	2, 718, 998	2, 159, 500	6. 6	235, 411	115, 225	. 4	11, 379, 189	7, 724, 800	22. 4	4, 747, 459	2, 584, 576	35. 4
Virginia	17, 075, 300	14, 224, 370	11. 6	11, 178, 426	6, 024, 657	131. 6	23, 365, 304	14, 305, 525	96. 1	15, 338, 841	7, 788, 463	151. 3
Washington	10, 490, 892	8, 215, 420	43. 8	3, 602, 095	2, 877, 960	40. 6	27, 136, 652	18, 743, 859	130. 7	10, 518, 856	5, 415, 589	145. 6
West Virginia	33, 664, 260	26, 392, 253	55. 3	76, 050	68, 445		13, 197, 614	6, 997, 529	38. 6	4, 278, 123	2, 139, 669	31. 3
Wisconsin	3, 316, 000	1, 866, 900	84. 4	3, 111, 353	1, 680, 073	47. 3	23, 068, 033	13, 141, 186	134. 8	25, 827, 654	14, 404, 603	182. 7
Wyoming	4, 710, 980	4, 103, 899	14. 6	6, 716, 910	5, 492, 627	52. 4	28, 753, 265	22, 848, 041	226. 7	7, 087, 954	4, 759, 848	105. 2
Alaska	7, 506, 013	6, 789, 348	87. 5	1, 053, 597	956, 452	168. 0	949, 400	861, 550	49. 4			
District of Columbia	95, 000	47, 500	. 3				960, 000	864, 000				
Hawaii	2, 823, 934	1, 411, 967	10. 5				1, 665, 126	838, 338	5. 8	424, 346	210, 823	. 1
Puerto Rico	3, 047, 703	1, 012, 602	7. 7				3, 361, 003	1, 615, 056	9. 1	1, 335, 524	674, 756	4. 3
Total	722, 541, 445	543, 854, 500	3, 014. 0	412, 936, 697	283, 434, 634	3, 056. 6	1, 478, 142, 674	984, 104, 640	7, 657. 3	616, 932, 978	339, 897, 881	6, 952. 7

---

[1] Includes projects on rural portions of the Federal-aid primary highway system financed from Federal-aid primary, secondary, and interstate funds.

[2] Initial commitment of funds.

Table 12.—Improvements on secondary roads in rural areas financed with Federal-aid funds: Status of projects as of June 30, 1957, and projects completed during the fiscal year

State or Territory	Programed,[1] plans not approved			Plans approved, not under construction			Under construction			Completed during fiscal year		
	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles
Alabama	$2,268,196	$1,180,418	79.5				$18,342,621	$9,190,966	637.1	$11,375,083	$5,687,292	489.1
Arizona	2,793,054	2,009,345	67.7	$1,832,883	$1,318,113	29.3	3,854,992	2,759,880	56.9	4,772,892	3,433,677	83.7
Arkansas	6,828,010	3,433,005	402.9				8,435,041	4,244,955	302.9	7,309,866	3,553,960	352.3
California	22,505,370	13,162,333	239.8				6,293,356	3,316,967	51.8	14,554,886	8,124,639	209.2
Colorado	4,767,883	2,529,520	85.5				8,541,548	4,121,588	132.8	6,980,493	3,375,153	170.5
Connecticut	1,198,250	599,125	3.4				4,218,425	1,815,185	12.1	1,657,154	918,978	5.6
Delaware	2,090,000	1,049,000	12.3	1,535,200	763,480	19.9	1,777,800	888,900	19.9	617,488	319,656	28.1
Florida	5,119,000	2,565,900	145.3				4,291,928	2,010,978	104.7	5,176,768	2,470,341	150.2
Georgia	13,953,362	7,144,823	376.7				23,332,393	11,701,987	617.0	11,919,706	5,714,833	433.5
Idaho	2,356,521	1,448,099	90.6				5,333,013	3,329,800	106.1	3,863,600	2,402,089	89.3
Illinois	20,440,456	10,218,829	487.8				21,634,824	10,812,146	587.9	12,017,279	5,947,995	386.7
Indiana	6,173,722	3,086,111	61.1	6,815,341	3,435,274	69.6	9,994,062	5,049,369	73.1	13,420,551	6,652,481	96.7
Iowa	10,621,388	3,384,934	353.7				21,647,078	10,863,528	1,051.5	10,594,795	5,303,613	711.6
Kansas	7,663,111	3,844,755	768.8				13,861,681	6,965,711	957.2	10,674,032	5,350,939	714.4
Kentucky	2,623,730	1,329,945	58.0				13,371,107	6,816,382	283.1	15,514,120	7,803,316	515.4
Louisiana	8,683,473	4,341,737	96.2				12,099,020	6,049,510	213.5	3,890,612	1,932,354	88.8
Maine	2,600,672	1,300,336	49.4				5,227,231	2,616,558	53.0	4,796,583	2,357,294	49.2
Maryland	2,784,440	1,394,220	52.6				7,574,556	4,040,535	139.0	2,469,736	1,118,219	130.2
Massachusetts	4,250,000	2,465,000	9.8				2,857,499	1,411,671	14.5	2,811,561	1,396,553	16.3
Michigan	11,895,750	5,961,275	567.4				12,122,970	6,061,485	270.3	15,865,410	7,741,470	595.1
Minnesota	3,960,428	2,055,414	311.2	13,470	12,123		11,919,882	6,051,036	968.5	13,165,292	6,651,697	1,272.7
Mississippi	8,850,150	4,238,935	450.4				14,418,951	6,909,035	581.6	8,733,956	3,954,471	469.8
Missouri	14,349,098	7,216,029	1,067.5				14,998,212	7,510,485	1,136.9	14,743,693	7,409,113	1,279.9
Montana	6,966,700	4,537,176	140.4				9,978,592	5,943,306	190.1	7,050,627	4,055,340	203.9
Nebraska	11,971,034	6,070,917	384.7				16,416,864	8,460,981	775.0	12,095,708	6,865,836	431.3
Nevada	1,497,000	1,251,639	21.1				6,638,553	5,529,477	206.0	4,761,470	3,852,545	156.9
New Hampshire	1,665,000	955,000	10.6				4,294,041	2,225,559	23.9	2,305,849	1,142,427	18.5
New Jersey	5,703,000	2,851,277	63.7				1,050,329	526,957	6.6	1,019,425	508,440	9.0
New Mexico	2,635,415	1,666,962	52.7	890,739	574,579	34.0	2,830,047	1,585,174	43.7	7,443,856	4,814,852	229.7
New York	4,136,217	2,068,109	30.7				26,184,075	12,148,133	135.8	7,819,571	3,550,495	42.9
North Carolina	7,220,818	3,604,044	161.9				15,097,270	7,368,407	316.9	9,032,950	4,298,841	248.4
North Dakota	6,140,360	3,079,055	1,124.1				10,225,437	5,174,346	755.6	7,229,297	3,690,656	926.5

Ohio	23,167,904	11,951,160	94.2				18,096,005	9,740,371	98.6	10,838,177	5,240,595	85.2
Oklahoma	5,792,371	2,896,252	322.3				12,426,448	6,104,683	369.2	10,116,247	4,933,433	344.7
Oregon	1,654,920	941,800	41.7				10,854,896	6,496,978	130.2	6,311,397	3,749,636	141.7
Pennsylvania	15,537,131	8,356,066	100.1				24,605,819	12,313,006	180.1	13,333,815	6,440,517	106.9
Rhode Island	1,095,000	547,500	1.7				809,032	404,466	2.2	949,986	474,993	9.1
South Carolina	5,103,800	2,675,050	284.3				9,088,583	4,550,022	646.9	2,740,552	1,406,434	188.0
South Dakota	4,915,178	2,763,571	354.4				9,127,715	5,202,853	522.0	7,325,630	4,177,099	432.7
Tennessee	14,808,392	7,231,996	415.1				13,101,495	6,016,564	450.6	8,370,944	4,128,229	478.3
Texas	10,901,435	5,539,111	364.9				26,641,178	13,343,300	758.7	23,613,234	11,743,800	1,083.6
Utah	3,925,798	2,467,569	87.9				4,335,018	3,237,900	143.4	3,106,310	2,145,573	80.6
Vermont	1,058,700	529,350	17.3				3,040,185	1,519,847	41.1	3,156,829	1,526,633	42.5
Virginia	8,775,472	4,625,416	142.9				14,877,886	7,518,620	204.7	10,482,619	5,333,847	324.5
Washington	5,705,168	3,231,900	132.5				8,560,843	4,459,719	140.6	6,479,746	3,623,752	167.8
West Virginia	6,246,298	3,161,120	10.0	3,489,670	1,754,263	8.7	7,604,144	3,883,976	48.1	2,238,466	1,149,389	8.0
Wisconsin	10,293,400	5,251,600	267.6				12,560,611	6,404,456	308.3	12,659,039	5,937,642	409.2
Wyoming	2,008,121	1,292,322	39.5				6,470,863	4,173,260	169.9	4,727,670	3,047,700	177.3
Alaska	3,591,677	3,234,524	17.0	1,759,000	1,620,455	186.4	1,179,500	1,085,491	59.3	45,000	40,500	
District of Columbia												
Hawaii	2,051,026	1,025,513	4.0				371,828	185,914	.7	5,080,385	2,517,415	10.7
Puerto Rico	800,000	400,000	3.6				7,678,808	3,742,577	43.2	2,471,194	1,181,991	16.0
Total	344,143,399	180,165,087	10,528.5	16,336,294	9,478,287	347.9	530,294,246	273,876,000	15,142.8	389,731,549	201,198,744	14,715.2

---

[1] Initial commitment of funds.

Table 13.—Improvements in urban areas financed with Federal-aid funds: [1] Status of projects as of June 30, 1957, and projects completed during the fiscal year

State or Territory	Programed,[2] plans not approved			Plans approved, not under construction			Under construction			Completed during fiscal year		
	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles
Alabama	$8, 863, 768	$5, 729, 806	46. 6	$2, 123, 276	$1, 269, 124	10. 0	$13, 686, 470	$8, 417, 321	56. 1	$3, 735, 051	$1, 942, 566	19. 5
Arizona	1, 055, 000	759, 400	3. 9	821, 866	583, 294	1. 2	4, 548, 810	3, 906, 515	1. 6	1, 127, 514	905, 561	5. 3
Arkansas	20, 045, 327	16, 935, 764	20. 5	4, 981, 250	2, 490, 625	31. 7	6, 999, 495	4, 134, 648	32. 8	1, 553, 948	921, 946	11. 4
California	2, 969, 000	979, 201	3. 4	29, 838, 270	20, 456, 721	19. 9	299, 098, 923	131, 274, 868	75. 5	50, 127, 265	25, 474, 941	49. 6
Colorado	4, 775, 000	4, 359, 970	3. 9	3, 718, 352	2, 363, 510	20. 0	11, 234, 837	8, 715, 011	7. 0	5, 450, 236	2, 818, 507	3. 0
Connecticut	1, 224, 186	592, 093	. 6	16, 469, 266	9, 040, 524	9. 5	6, 656, 107	5, 404, 798	11. 7	5, 111, 409	2, 577, 028	5. 7
Delaware	260, 000	154, 000	1. 8	152, 720	74, 550	. 7	2, 152, 800	1, 043, 291	2. 5	1, 387, 600	693, 800	. 1
Florida	12, 400, 000	11, 020, 000	1. 8	14, 895, 258	10, 900, 636	11. 7	13, 928, 860	8, 758, 370	13. 5	18, 779, 642	10, 429, 391	65. 8
Georgia	13, 004, 412	10, 591, 471	7. 4	2, 889, 508	1, 767, 009	1. 0	31, 609, 884	18, 452, 310	18. 6	4, 021, 355	2, 362, 701	11. 0
Idaho	1, 561, 272	1, 276, 958	. 5	623, 791	602, 171	. 3	914, 646	619, 746	2. 1	1, 872, 242	1, 412, 718	3. 0
Illinois	25, 825, 142	19, 824, 697	15. 8	48, 844, 769	40, 591, 987	20. 3	76, 932, 007	58, 878, 224	47. 8	23, 225, 034	11, 555, 351	25. 7
Indiana	6, 516, 499	4, 035, 650	7. 7	2, 469, 365	1, 590, 004	1. 0	10, 069, 301	6, 482, 174	18. 5	15, 056, 389	9, 093, 865	38. 5
Iowa	4, 704, 141	4, 211, 047	8. 2	4, 023, 015	3, 117, 030	21. 3	9, 085, 272	6, 022, 547	36. 3	5, 491, 108	3, 079, 994	21. 3
Kansas	8, 064, 998	7, 258, 500	7. 9	3, 060, 094	2, 690, 968	13. 7	12, 181, 334	8, 280, 419	35. 0	9, 100, 335	4, 827, 488	56. 6
Kentucky				3, 449, 518	2, 381, 186	4. 2	16, 350, 624	12, 031, 841	7. 3	10, 375, 557	5, 730, 163	31. 6
Louisiana	14, 676, 428	9, 843, 694	10. 2	2, 971, 520	2, 052, 680	. 5	17, 605, 584	8, 516, 287	2. 9	8, 121, 503	4, 838, 628	29. 1
Maine	550, 738	278, 369	2. 4	2, 261, 580	1, 213, 370	. 8	2, 436, 493	1, 365, 382	4. 4	1, 714, 990	815, 365	3. 7
Maryland	14, 839, 995	7, 910, 000	9. 3	6, 300, 340	4, 360, 815	1. 4	37, 338, 858	25, 382, 850	21. 6	9, 295, 197	5, 254, 791	10. 8
Massachusetts	13, 572, 167	6, 786, 085	7. 8	33, 274, 874	22, 529, 255	11. 2	48, 019, 247	26, 452, 451	18. 9	12, 061, 795	6, 602, 250	7. 7
Michigan	34, 044, 297	27, 754, 600	24. 9	21, 373, 125	10, 119, 943	11. 6	23, 563, 566	13, 602, 375	33. 6	26, 112, 424	13, 230, 893	92. 6
Minnesota	4, 610, 000	4, 072, 000	3. 2	8, 426, 546	6, 503, 208	16. 1	44, 641, 697	33, 377, 202	78. 5	11, 643, 543	6, 097, 820	114. 2
Mississippi	11, 842, 036	9, 870, 076	58. 9	7, 904, 000	6, 786, 560	14. 0	7, 734, 634	5, 546, 195	11. 2	3, 418, 019	1, 782, 521	34. 4
Missouri	3, 486, 814	1, 748, 257	1. 2	14, 864, 281	11, 598, 607	16. 5	55, 509, 624	33, 672, 116	58. 1	23, 489, 174	13, 390, 968	9. 0
Montana	402, 331	300, 552	. 4	812, 521	460, 132	3. 8	13, 440, 519	10, 524, 644	20. 7	1, 031, 688	582, 734	7. 4
Nebraska	464, 310	242, 055	3. 2	1, 118, 962	534, 912	. 8	1, 336, 697	671, 571	2. 9	3, 280, 855	1, 652, 545	18. 6
Nevada							1, 872, 094	1, 528, 963	3. 4	993, 730	910, 087	. 8
New Hampshire	5, 319, 950	4, 497, 938	3. 6	1, 304, 025	1, 015, 186	1. 4	2, 050, 297	1, 548, 820	5. 5	1, 812, 389	1, 142, 984	2. 6
New Jersey	3, 470, 000	2, 135, 000	3. 8	10, 976, 829	6, 533, 887	6. 0	33, 500, 249	21, 066, 166	20. 9	20, 027, 235	9, 257, 688	25. 9
New Mexico	26, 470	19, 297		123, 734	86, 342	. 9	3, 771, 145	2, 372, 668	16. 7	2, 409, 413	1, 516, 521	12. 0
New York	16, 757, 590	9, 318, 795	14. 6	29, 300, 847	14, 487, 995	24. 6	288, 115, 438	163, 881, 243	128. 3	76, 792, 195	35, 870, 573	48. 4
North Carolina	2, 637, 062	1, 530, 581	5. 9	2, 639, 611	2, 004, 131	15. 1	10, 712, 933	4, 932, 970	46. 8	6, 214, 797	3, 094, 484	43. 5
North Dakota	31, 061	15, 530	. 7	730, 700	422, 074	22. 3	1, 956, 875	1, 558, 998	16. 9	616, 169	397, 254	17. 1

Ohio	22, 002, 224	16, 290, 317	11. 1	24, 431, 305	17, 849, 148	8. 0	62, 542, 111	42, 465, 162	23. 6	29, 846, 951	17, 154, 519	11. 0
Oklahoma	6, 309, 802	3, 676, 664	23. 6	3, 299, 382	1, 652, 846	8. 2	11, 829, 483	6, 949, 438	24. 2	10, 300, 751	5, 660, 231	35. 3
Oregon	1, 205, 909	1, 099, 000	. 7	1, 496, 941	1, 311, 100	5. 3	7, 567, 004	5, 054, 088	13. 0	1, 122, 572	646, 608	2. 3
Pennsylvania	53, 330, 420	37, 574, 219	30. 3	38, 159, 617	25, 399, 641	7. 1	106, 068, 148	67, 829, 319	57. 0	32, 624, 138	16, 126, 587	33. 5
Rhode Island	2, 513, 274	1, 256, 637	7. 8	3, 213, 910	2, 892, 519	. 2	23, 205, 057	14, 316, 242	18. 9	4, 235, 551	2, 117, 466	7. 3
South Carolina	4, 290, 000	2, 569, 000	4. 5	106, 000	106, 000		6, 743, 768	4, 067, 852	20. 4	1, 605, 281	819, 407	4. 5
South Dakota	6, 726, 179	5, 385, 067	10. 8	223, 356	124, 855	1. 2	1, 317, 034	1, 193, 436		1, 794, 296	990, 214	4. 4
Tennessee	29, 907, 236	25, 586, 419	4. 1	6, 093, 176	3, 046, 590	3. 7	30, 285, 099	18, 281, 848	14. 5	9, 850, 644	4, 600, 533	31. 5
Texas	7, 910, 600	7, 119, 540	7. 7	28, 121, 830	20, 804, 540	35. 1	63, 067, 502	39, 663, 500	216. 1	28, 098, 191	13, 859, 000	160. 8
Utah	1, 444, 406	1, 077, 241	3. 4	1, 055, 425	783, 933	3. 0	2, 286, 497	1, 815, 184	9. 5	1, 540, 837	1, 110, 973	4. 2
Vermont	727, 500	368, 250	. 6				5, 703, 119	4, 277, 372	4. 3	131, 631	65, 690	. 3
Virginia	22, 029, 475	18, 281, 737	19. 4	5, 605, 807	3, 453, 590	5. 2	4, 832, 834	2, 404, 168	5. 6	5, 640, 879	2, 475, 828	4. 7
Washington	6, 154, 769	4, 596, 610	34. 5	1, 194, 252	968, 441	7. 8	14, 879, 491	10, 116, 518	31. 6	6, 340, 840	3, 088, 759	21. 4
West Virginia	3, 863, 448	2, 305, 524	. 7	452, 629	226, 315	2. 2	10, 573, 505	5, 295, 197	9. 4	2, 584, 321	1, 296, 835	2. 3
Wisconsin	3, 488, 000	2, 298, 900	4. 1	5, 020, 091	2, 533, 248	13 3	29, 204, 511	18, 782, 903	24. 0	9, 161, 466	4, 461, 216	17. 3
Wyoming	3, 191, 817	2, 773, 997	4. 2	797, 213	476, 477	2. 7	4, 134, 636	3, 560, 361	5. 1	427, 585	275, 279	2. 0
Alaska	1, 231	1, 119					6, 600	5, 940				
District of Columbia	6, 030, 000	4, 839, 000	2. 6	10, 840, 147	7, 924, 741	4. 6	10, 487, 000	7, 760, 013	. 6	2, 056, 122	979, 266	1. 8
Hawaii	111, 860	55, 930	. 2				1, 813, 109	806, 226	1. 9	338, 222	161, 930	
Puerto Rico	290, 000	145, 000	1. 5				7, 131, 483	3, 256, 792	3. 8	6, 288, 563	2, 609, 253	5. 6
Total	419, 528, 144	311, 354, 557	451. 9	412, 854, 894	280, 182, 720	421. 1	1, 512, 733, 311	896, 327, 543	1, 341. 1	519, 438, 642	268, 763, 720	1, 176. 1

---

[1] Includes projects in urban areas financed from Federal-aid primary, secondary, urban, and interstate funds.
[2] Initial commitment of funds.

Table 14.—Interstate System improvements financed with Federal-aid funds: [1] Status of projects as of June 30, 1957, and projects completed during the fiscal year

State or Territory	Programed,[2] plans not approved			Plans approved, not under construction			Under construction			Completed during fiscal year		
	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles
Alabama	$25, 923, 036	$23, 011, 230	116. 4	$899, 029	$809, 126	5. 3	$24, 575, 521	$20, 319, 069	36. 2	$3, 499, 816	$1, 993, 134	21. 2
Arizona	18, 218, 705	17, 050, 718	90. 7	7, 136, 164	6, 511, 532	43. 2	9, 508, 253	8, 580, 326	22. 8	2, 588, 750	2, 041, 829	37. 8
Arkansas	23, 380, 593	20, 660, 636	22. 8	4, 377, 350	3, 636, 066	17. 4	9, 439, 769	7, 008, 209	15. 2	1, 155, 843	816, 792	3. 3
California	8, 820, 780	1, 300	7. 3	31, 234, 047	26, 142, 493	39. 6	283, 065, 435	141, 032, 147	75. 0	34, 094, 808	18, 143, 188	47. 3
Colorado	8, 674, 999	7, 920, 710	19. 3	7, 754, 660	6, 595, 190	37. 3	18, 556, 453	15, 879, 172	52. 2	11, 180, 140	6, 182, 714	53. 0
Connecticut	322, 818	290, 536		11, 019, 111	8, 729, 168	4. 1	7, 477, 024	6, 151, 039	10. 8	4, 929, 256	2, 653, 688	10. 7
Delaware				600, 000	540, 000	. 1	5, 025, 665	3, 359, 993		15, 274	7, 637	
Florida	17, 561, 995	15, 805, 800	15. 1	12, 595, 152	9, 689, 100	8. 1	8, 039, 113	6, 433, 787	3. 0	3, 172, 078	2, 401, 091	. 7
Georgia	18, 571, 080	15, 542, 473	8. 4	3, 987, 992	2, 282, 480	5. 3	41, 028, 875	26, 343, 337	28. 9	2, 576, 333	1, 636, 024	18. 9
Idaho	8, 959, 687	8, 268, 894	10. 7	3, 000, 000	2, 768, 700	9. 5	6, 586, 435	4, 913, 036	15. 7	207, 776	167, 440	17. 3
Illinois	34, 452, 533	30, 420, 274	8. 8	47, 906, 023	40, 796, 561	22. 1	80, 411, 006	66, 073, 558	34. 5	31, 222, 767	17, 148, 513	43. 7
Indiana	7, 202, 299	4, 522, 630	5. 3	813, 000	487, 800		18, 655, 812	13, 969, 084	. 9	7, 140, 682	4, 123, 456	12. 1
Iowa	39, 691, 811	35, 970, 646	97. 3	2, 231, 234	1, 741, 850	7. 4	24, 014, 027	19, 719, 696	57. 4	2, 989, 395	2, 397, 928	
Kansas	38, 819, 543	34, 937, 605	91. 3	4, 697, 362	4, 227, 624	16. 7	11, 568, 311	9, 232, 559	3. 1	6, 065, 619	4, 251, 418	56. 9
Kentucky	3, 100, 000	2, 790, 000	10. 5	178, 490	89, 245		27, 824, 909	21, 883, 925	3. 8	1, 618, 904	1, 060, 881	. 4
Louisiana	18, 575, 000	15, 976, 500	16. 7	4, 681, 950	4, 213, 755	5. 8	11, 394, 371	8, 217, 339		3, 824, 727	2, 705, 302	14. 8
Maine	737, 860	664, 074	1. 0	825, 800	495, 480	. 2	4, 172, 354	2, 599, 567	8. 2	217, 408	167, 127	
Maryland	4, 407, 673	2, 053, 303	. 4	9, 836, 040	8, 381, 055	4. 2	35, 825, 046	27, 857, 769	18. 8	2, 658, 629	1, 702, 013	13. 6
Massachusetts	16, 730, 154	13, 273, 594	8. 3	19, 862, 914	16, 949, 092	6. 8	14, 884, 171	10, 904, 096	2. 0	2, 800, 000	2, 511, 000	
Michigan	50, 256, 299	44, 729, 004	42. 8	9, 084, 659	7, 820, 074	2. 7	68, 886, 991	54, 120, 740	86. 6	17, 467, 838	9, 430, 562	44. 3
Minnesota	12, 252, 300	11, 210, 800	8. 8	8, 853, 690	7, 968, 313	9. 1	41, 246, 868	35, 470, 246	32. 8	3, 761, 498	2, 402, 213	55. 6
Mississippi	20, 677, 328	18, 428, 076	71. 7	19, 768, 400	17, 551, 596	51. 6	12, 096, 431	9, 395, 148	7. 1	3, 694, 333	2, 124, 141	36. 4
Missouri	950, 658	855, 658		12, 829, 953	11, 459, 363	18. 4	59, 350, 678	42, 795, 282	62. 6	26, 242, 270	15, 844, 672	48. 2
Montana	962, 055	842, 727	8. 5	191, 295	124, 916	13. 7	17, 922, 547	15, 512, 442	18. 5	1, 362, 822	1, 031, 565	35. 2
Nebraska	5, 066, 013	3, 342, 611	6. 2	3, 495, 059	3, 078, 688	6. 8	4, 652, 700	3, 967, 318		541, 662	467, 964	
Nevada	2, 775, 000	2, 636, 250	4. 3	3, 528, 972	3, 350, 517	6. 3	4, 278, 865	3, 866, 472	5. 5	166, 541	135, 797	
New Hampshire	9, 854, 997	8, 807, 463	11. 4	910, 185	818, 266	. 8	7, 260, 073	5, 512, 330	6. 7	1, 843, 248	1, 144, 688	4. 6
New Jersey	1, 590, 000	1, 431, 000		20, 399, 806	18, 279, 297	10. 3	23, 071, 381	19, 477, 434	3. 4	62, 918	37, 750	
New Mexico	1, 464, 375	1, 355, 752	5. 8	4, 745, 528	4, 393, 409	16. 7	21, 674, 391	20, 147, 743	82. 5	3, 206, 417	2, 617, 062	11. 8
New York	5, 145, 781	4, 419, 518		32, 628, 998	19, 534, 905	8. 3	210, 676, 984	151, 503, 673	57. 2	38, 549, 730	17, 614, 046	10. 0
North Carolina	13, 650, 792	12, 192, 832	65. 1	5, 108, 420	4, 465, 252	61. 1	24, 157, 884	17, 966, 349	142. 1	12, 141, 129	7, 479, 775	65. 8
North Dakota	13, 027, 102	11, 613, 555	55. 3	4, 663, 694	4, 214, 452	20. 9	5, 804, 609	5, 130, 414	49. 5	1, 386, 291	1, 028, 481	12. 1

Ohio	31, 022, 685	27, 699, 030	15. 7	23, 860, 277	21, 261, 636	14. 6	88, 818, 210	68, 885, 409	72. 2	26, 182, 054	16, 410, 265	10. 8
Oklahoma	16, 764, 445	14, 784, 870	40. 1	12, 579, 671	10, 601, 944	38. 8	13, 946, 216	11, 181, 958	22. 7	5, 847, 343	3, 537, 326	13. 8
Oregon	6, 109, 262	5, 583, 800	11. 2	2, 914, 293	2, 688, 657	8. 1	18, 925, 127	16, 509, 944	56. 3	5, 651, 195	3, 808, 036	39. 7
Pennsylvania	59, 081, 398	52, 961, 767	68. 4	30, 198, 736	27, 110, 859	6. 7	90, 888, 896	70, 547, 138	51. 1	22, 934, 294	13, 131, 230	9. 1
Rhode Island	281, 250	253, 125	---	3, 884, 320	3, 495, 888	. 4	25, 773, 604	18, 991, 518	8. 9	7, 292	3, 646	---
South Carolina	23, 160, 000	20, 694, 600	51. 2	1, 918, 000	1, 582, 000	15. 7	8, 780, 402	6, 919, 968	24. 6	1, 134, 129	722, 122	10. 2
South Dakota	20, 305, 712	18, 150, 313	42. 1	---	---	---	10, 124, 628	8, 508, 997	49. 7	2, 387, 944	1, 539, 953	68. 0
Tennessee	42, 491, 016	38, 197, 528	12. 1	---	---	---	28, 152, 407	21, 570, 743	3. 1	1, 992, 118	673, 972	---
Texas	8, 403, 600	7, 563, 240	14. 8	30, 984, 653	27, 215, 540	72. 8	71, 358, 056	58, 514, 030	252. 2	41, 263, 887	23, 353, 280	254. 4
Utah	7, 879, 838	7, 478, 243	11. 6	---	---	---	5, 735, 276	5, 166, 676	. 2	4, 837, 307	3, 703, 682	28. 2
Vermont	1, 999, 998	1, 800, 000	1. 9	---	---	---	11, 597, 351	9, 276, 385	5. 9	24, 284	14, 298	---
Virginia	31, 945, 000	28, 787, 500	11. 6	1, 821, 685	1, 089, 883	6. 3	9, 688, 801	7, 253, 952	20. 0	1, 930, 394	1, 147, 704	12. 6
Washington	10, 511, 077	9, 556, 830	19. 5	3, 357, 806	3, 045, 470	22. 4	23, 267, 941	18, 746, 347	55. 0	2, 128, 755	1, 208, 820	10. 1
West Virginia	28, 450, 688	23, 869, 367	35. 7	---	---	---	5, 497, 530	3, 063, 975	2. 4	8, 210	4, 105	---
Wisconsin	3, 958, 000	2, 725, 200	55. 1	1, 573, 699	948, 900	3. 4	20, 305, 547	15, 765, 600	2. 3	6, 118, 842	4, 629, 770	1. 3
Wyoming	6, 285, 515	5, 837, 337	14. 6	4, 594, 212	4, 126, 310	27. 2	22, 608, 758	19, 853, 218	107. 5	2, 506, 938	1, 796, 298	24. 6
Alaska	---	---	---	112, 000	101, 818	56. 8	---	---	---	---	---	---
District of Columbia	4, 430, 000	4, 039, 000	. 2	6, 128, 373	5, 570, 736	. 6	8, 510, 056	7, 158, 954	---	1, 435, 830	684, 260	1. 3
Total	734, 902, 750	641, 007, 919	1, 216. 0	423, 772, 702	356, 985, 006	733. 6	1, 607, 111, 758	1, 173, 258, 111	1, 677. 1	358, 775, 718	209, 838, 658	1, 159. 8

---

[1] Includes projects financed from Federal-aid primary, secondary, urban, and interstate funds.
[2] Initial commitment of funds.

Table 15.—Mileage of designated Federal-aid highway systems, by State, as of December 31, 1956

State or Territory	National System of Interstate and Defense Highways			Federal-aid primary highway system [1]			Federal-aid secondary highway system		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
	Miles	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*
Alabama	947	822	125	6, 185	5, 597	588	16, 971	16, 608	363
Arizona	1, 187	1, 152	35	2, 633	2, 558	75	3, 777	3, 655	122
Arkansas	547	482	65	3, 923	3, 715	208	13, 745	13, 634	111
California	2, 159	1, 794	365	7, 206	6, 111	1, 095	10, 233	9, 755	478
Colorado	678	645	33	4, 270	4, 140	130	3, 850	3, 802	48
Connecticut	278	158	120	1, 267	888	379	1, 153	1, 005	148
Delaware	42	38	4	568	521	47	1, 419	1, 402	17
Florida	1, 173	1, 008	165	5, 433	4, 877	556	10, 726	10, 454	272
Georgia	1, 171	1, 051	120	8, 438	7, 961	477	13, 005	12, 890	115
Idaho	659	637	22	3, 099	3, 027	72	4, 620	4, 580	40
Illinois	1, 662	1, 351	311	10, 564	9, 417	1, 147	10, 868	10, 737	131
Indiana	1, 112	901	211	5, 467	4, 867	600	15, 837	15, 622	215
Iowa	736	670	66	10, 128	9, 580	548	33, 137	32, 904	233
Kansas	771	702	69	7, 950	7, 568	382	22, 782	22, 689	93
Kentucky	668	590	78	4, 472	4, 191	281	15, 216	15, 128	88
Louisiana	657	545	112	3, 223	2, 893	330	7, 730	7, 616	114
Maine	313	277	36	1, 934	1, 806	128	2, 299	2, 249	50
Maryland	355	234	121	2, 359	1, 990	369	5, 973	5, 796	177
Massachusetts	415	217	198	2, 138	1, 359	779	2, 206	1, 666	540
Michigan	1, 098	895	203	6, 929	6, 341	588	21, 732	21, 489	243
Minnesota	935	789	146	8, 876	8, 184	692	19, 317	19, 162	155
Mississippi	691	611	80	5, 163	4, 940	223	9, 487	9, 405	82
Missouri	1, 159	1, 062	97	8, 811	8, 409	402	19, 365	19, 252	113
Montana	1, 239	1, 210	29	5, 926	5, 841	85	4, 467	4, 451	16
Nebraska	503	475	28	5, 668	5, 509	159	13, 100	13, 071	29
Nevada	540	529	11	2, 196	2, 164	32	2, 486	2, 474	12
New Hampshire	214	183	31	1, 206	1, 093	113	1, 590	1, 544	46
New Jersey	354	186	168	2, 024	1, 287	737	1, 980	1, 540	440

New Mexico	1, 013	968	45	4, 026	3, 861	165	5, 236	5, 190	46
New York	1, 232	747	485	10, 795	8, 565	2, 230	19, 311	19, 028	283
North Carolina	714	627	87	6, 887	6, 471	416	24, 112	23, 941	171
North Dakota	517	496	21	3, 525	3, 462	63	13, 531	13, 513	18
Ohio	1, 353	1, 098	255	7, 775	6, 840	935	16, 905	16, 521	384
Oklahoma	835	747	88	8, 030	7, 700	330	11, 747	11, 674	73
Oregon	757	684	73	4, 062	3, 843	219	5, 463	5, 403	60
Pennsylvania	1, 478	1, 126	352	7, 513	6, 408	1, 105	13, 220	12, 321	899
Rhode Island	68	21	47	460	251	209	384	280	104
South Carolina	769	714	55	4, 706	4, 453	253	13, 396	13, 250	146
South Dakota	531	512	19	4, 821	4, 738	83	12, 383	12, 363	20
Tennessee	1, 093	1, 002	91	5, 416	5, 133	283	9, 735	9, 688	47
Texas	2, 912	2, 569	343	17, 131	15, 909	1, 222	27, 855	27, 605	250
Utah	716	659	57	2, 235	2, 142	93	3, 359	3, 296	63
Vermont	344	309	35	1, 581	1, 502	79	1, 804	1, 781	23
Virginia	1, 008	875	133	4, 691	4, 342	349	18, 034	17, 851	183
Washington	632	511	121	3, 606	3, 342	264	9, 648	9, 391	257
West Virginia	226	183	43	2, 596	2, 392	204	10, 671	10, 579	92
Wisconsin	482	427	55	6, 365	5, 896	469	18, 624	18, 354	270
Wyoming	1, 019	991	28	3, 637	3, 581	56	2, 124	2, 105	19
District of Columbia	28	-----	28	140	-----	140	78	-----	78
Hawaii	-----	-----	-----	532	495	37	602	592	10
Puerto Rico	-----	-----	-----	550	426	124	1, 085	1, 044	41
Total	39, 990	34, 480	5, 510	249, 136	228, 586	20, 550	528, 378	520, 350	8, 028

---

[1] Figures include mileage of Interstate System.

Table 16.—Status of National forest highway projects as of June 30, 1957, and projects completed during the fiscal year [1]

State or Territory	Programed,[2] construction not yet authorized			Construction authorized, not started			Under construction			Completed during fiscal year		
	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles
Alabama	$90, 000	$40, 000	7. 7	$114, 300	$57, 150	8. 4				$43, 462	$21, 653	5. 3
Arizona	575, 000	575, 000	16. 6	131, 000	131, 000	2. 8	$1, 636, 442	$1, 636, 442	30. 4	1, 065, 050	1, 065, 050	27. 9
Arkansas	849, 278	374, 639	18. 7	272, 830	136, 415	8. 7	156, 100	78, 050	3. 4	1, 036, 651	749, 981	28. 3
California	2, 700, 000	2, 700, 000	38. 9	1, 459, 400	1, 459, 400	9. 0	2, 650, 000	2, 590, 000	11. 7	3, 483, 573	3, 483, 573	19. 6
Colorado	2, 387, 000	2, 387, 000	25. 7				1, 034, 000	1, 034, 000	10. 3	1, 130, 177	1, 130, 177	8. 5
Florida	350, 000	175, 000	11. 5				730, 978	365, 203	28. 8	810, 235	374, 493	33. 3
Georgia				504, 868	252, 434	5. 5				102, 100	51, 050	2. 2
Idaho	2, 447, 000	2, 447, 000	32. 4	618, 500	618, 500	4. 8	1, 820, 599	1, 820, 599	40. 0	1, 748, 689	1, 748, 689	70. 5
Illinois	230, 460	115, 230	3. 4									
Indiana				267, 070	124, 476	. 6						
Iowa				1, 126	563	. 4	23, 136	8, 078				
Kentucky				64, 093	64, 093	2. 4						
Louisiana							227, 640	114, 820	9. 1	460, 088	205, 480	1. 8
Maine	10, 646	10, 646	1. 5	19, 073	19, 073	1. 5						
Michigan	786, 529	375, 000	13. 6				626, 400	311, 950	9. 9	80, 849	80, 849	5. 4
Minnesota				130, 000	130, 000	11. 2	507, 000	507, 000	15. 0			
Mississippi				343, 500	343, 500	1. 1						
Missouri	308, 139	308, 139	6. 0									
Montana	1, 123, 000	1, 123, 000	15. 2	768, 000	768, 000	33. 8	2, 545, 526	2, 545, 526	50. 4	1, 532, 660	1, 532, 660	44. 1
Nebraska	52, 021	44, 181	2. 8							52, 947	52, 551	8. 7
Nevada	430, 000	430, 000	5. 6	270, 000	270, 000	4. 4	511, 000	314, 000	. 6	468, 500	468, 500	5. 1
New Hampshire										434, 121	434, 121	3. 1
New Mexico	700, 000	700, 000	18. 5	716, 000	716, 000	4. 8	440, 000	440, 000	4. 9	278, 136	278, 136	3. 9
North Carolina				483, 000	241, 500	6. 7	1, 020, 990	511, 710	8. 7	366, 770	183, 385	11. 7
Oklahoma										111, 500	58, 458	1. 3
Oregon	2, 053, 000	2, 053, 000	27. 9				4, 929, 707	4, 929, 707	54. 2	2, 708, 507	2, 708, 507	61. 6
Pennsylvania	165, 000	165, 000	2. 2							199, 648	199, 648	6. 4
South Carolina				136, 200	47, 000	7. 0	30, 400	15, 000	2. 5	34, 200	16, 500	3. 0
South Dakota	370, 000	370, 000					177, 400	49, 632	4. 6	186, 814	186, 814	1. 6
Tennessee										730, 434	365, 214	23. 0
Texas	170, 700	85, 200	9. 6	143, 400	71, 600	7. 3						
Utah	878, 000	878, 000	41. 0				324, 000	324, 000	13. 6	870, 700	870, 700	35. 9

Vermont	32, 835	32, 835	1. 7							201, 281	100, 178	2. 4
Virginia	565, 000	390, 000	18. 3				65, 900	32, 950	. 3	32, 636	16, 318	3. 2
Washington	1, 525, 000	1, 525, 000	8. 8	745, 000	745, 000	7. 3	668, 000	668, 000	17. 8	1, 083, 165	1, 083, 165	21. 1
West Virginia	32, 700	16, 350								544, 300	272, 150	21. 5
Wisconsin				137, 583	137, 583	6. 6	458, 144	229, 000	7. 4			
Wyoming	205, 000	205, 000					1, 572, 000	1, 572, 000	10. 4	521, 470	521, 470	29. 4
Alaska	795, 000	795, 000	2. 4	1, 753, 250	1, 753, 250	38. 9	1, 028, 000	1, 028, 000	21. 4	660, 345	660, 345	7. 5
Puerto Rico				68, 627	68, 627	. 4						
Total	19, 831, 308	18, 320, 220	330. 0	9, 146, 820	8, 155, 164	173. 6	23, 183, 362	21, 125, 667	355. 4	20, 979, 008	18, 919, 815	497. 3

---

[1] Includes construction projects only.
[2] Initial commitment of funds.

Table 17.—Mileage of the National forest highway system, by forest road class and by State, as of June 30, 1957

Region and State or Territory	Total	Class 1 [1]	Class 2 [2]	Class 3 [3]
Western Region:	*Miles*	*Miles*	*Miles*	*Miles*
Arizona	1, 033. 7	328. 2	534. 9	170. 6
California	2, 459. 5	675. 3	414. 2	1, 370. 0
Colorado	1, 493. 7	577. 0	525. 7	391. 0
Idaho	1, 216. 6	643. 4	257. 0	316. 2
Montana	1, 193. 7	685. 8	208. 4	299. 5
Nevada	312. 6	155. 0	130. 5	27. 1
New Mexico	655. 6	131. 0	417. 9	106. 7
Oregon	1, 416. 2	684. 7	461. 8	269. 7
South Dakota	302. 0	189. 0	101. 0	12. 0
Utah	747. 8	222. 0	230. 8	295. 0
Washington	732. 0	389. 0	107. 5	235. 5
Wyoming	477. 0	349. 0	109. 0	19. 0
Alaska	393. 4	166. 3	192. 2	34. 9
Total	12, 433. 8	5, 195. 7	3, 690. 9	3, 547. 2
Eastern Region:				
Alabama	367. 8	84. 1	229. 0	54. 7
Arkansas	633. 3	96. 7	536. 6	
Florida	287. 9	32. 9	194. 4	60. 6
Georgia	364. 1	153. 4	148. 2	62. 5
Illinois	301. 8	241. 3	41. 4	19. 1
Indiana	101. 2	53. 6	47. 6	
Iowa	20. 0	11. 3	8. 3	. 4
Kentucky	352. 9	131. 1	216. 8	5. 0
Louisiana	398. 2	54. 1	167. 5	176. 6
Maine	14. 0			14. 0
Michigan	1, 169. 5	585. 8	529. 6	54. 1
Minnesota	718. 1	312. 9	323. 2	82. 0
Mississippi	538. 0	266. 6	260. 1	11. 3
Missouri	998. 9	385. 9	541. 8	71. 2
Nebraska	23. 5		23. 0	. 5
New Hampshire	166. 0	61. 9	39. 6	64. 5
North Carolina	840. 3	367. 4	411. 6	61. 3
Ohio	133. 6	70. 4	43. 1	20. 1
Oklahoma	46. 2	29. 6	16. 6	
Pennsylvania	353. 9	118. 4	85. 9	149. 6
South Carolina	777. 5	237. 9	424. 9	114. 7
Tennessee	566. 5	165. 1	341. 2	60. 2
Texas	332. 0	128. 3	187. 2	16. 5
Vermont	119. 1	32. 7	61. 9	24. 5
Virginia	1, 371. 8	374. 2	886. 6	111. 0
West Virginia	484. 1	78. 4	364. 7	41. 0
Wisconsin	469. 1	75. 7	352. 4	41. 0
Puerto Rico	44. 6		44. 6	
Total	11, 993. 9	4, 149. 7	6, 527. 8	1, 316. 4
Grand total	24, 427. 7	9, 345. 4	10, 218. 7	4, 863. 6

[1] Forest roads which are on the Federal-aid primary system.
[2] Forest roads which are on the Federal-aid secondary system.
[3] Other forest highways.

Table 18.—Mileage of highways in National parks, monuments, and parkways constructed by the Bureau of Public Roads during the fiscal year

Park, monument, or parkway (and State)	Under construction as of June 30, 1957	Completed during fiscal year
	Miles	*Miles*
Acadia (Maine)	12.4	6.6
Badlands (S. Dak.)	17.5	
Blue Ridge (Va.–N. C.)	37.3	13.8
Colonial Park (Va.)	8.4	5.0
Colonial Parkway (Va.)	11.9	11.0
Everglades (Fla.)	17.0	18.2
George Washington Memorial (Va.)	5.6	
Grand Canyon (Ariz.)	24.7	
Grand Teton (Wyo.)	22.7	
Great Smoky Mountains (N. C.)		5.3
Hawaii National Park (Hawaii)		2.4
Mesa Verde (Colo.)	3.0	.3
Mount Rainier (Wash.)	18.6	6.0
Natchez Trace (Ala.–Miss.–Tenn.)	33.8	33.1
Olympic (Wash.)	7.0	.2
Sequoia-Kings Canyon (Calif.)		.1
Shenandoah (Va.)		29.2
Wind Cave (S. Dak.)		5.5
Yellowstone (Wyo.)	15.4	
Yosemite (Calif.)		1.2
Total	235.3	137.9

Table 19.—Mileage of approach roads to National parks, monuments, and parkways constructed by the Bureau of Public Roads during the fiscal year

Park, monument, or parkway (and State)	Under construction as of June 30, 1957	Completed during fiscal year
	Miles	*Miles*
Grand Canyon (Ariz.)	13.1	
Sequoia-Kings Canyon (Calif.)	2.0	
Walnut Canyon (Ariz.)		3.1
Total	15.1	3.1

U. S. GOVERNMENT PRINTING OFFICE: 1958